D.O.R.C. International b.v.

CE 0344

SERVICE MANUAL

6700

Associate Dual Unit

Manufacturer :

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The Netherlands

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TECHNOLOGY CREATED BY VISION

Contents

Section 0 – Revision Information

Datum	Revision	Description	From serial number
2002	A (Version 1.0)	First version	
2003	B (Version 1.1)	New power supply pcb 206152 Rev:01 Modification base plate. 206151 Rev:03	200351179
2004	C (Version 1.2)	Text update	
2004-08	D (Version 1.3)	To prepare 2500 cuts range Introducing 2500 cuts range	200451214 200451243
2005-01	E (Version 1.4)	Text update specification page	
2007-03	F (Version 1.5)	Introduction new PC-board with XP Embedded and introduction GUI 2.5	200751421
2008-03	G	Upgrade front page	

Section 1 - General Information

1.1 Introduction

The ASSOCIATE® provides all necessary functions to perform phaco and vitrectomy surgery. The unit includes eight separate function modules, a remote control and a footswitch.

The function modules are:

- Phaco-Emulsification / Fragmentation Module
- Vitrectomy Module
- Irrigation/Aspiration Module
- Diathermy Module
- Triple Port Illumination Module
- Air Module
- VFI Module
- VFE Module

These modules may be used together, or in combination. Functions of some of the modules are interactive. For example, when the Phaco & Vitrectomy Module is activated, the Irrigation/Aspiration Module is activated also. A Footswitch provides a convenient way of controlling several modules at once.

The phaco and vitrectomy modules are prepared for a future combination with a laser source.

To provide the ophthalmic surgeon the optimum convenience, the ASSOCIATE® is equipped with a dual pump system, Peristaltic and Venturi selectable for both anterior and posterior surgery.

High Vacuum Sensor Cartridge
The ASSOCIATE® operates on one cartridge suitable for Peristaltic and Venturi aspiration system and is suitable for both anterior and posterior segment surgery. An integrated microprocessor guarantees an optimal intraocular vacuum and **High Vacuum Occlusion Technology** for advanced capsular protection in phaco surgery. Due tot the integrated microprocessor technology, a maximum sterile barrier is guaranteed.

The first part of this manual includes some general instructions for the unit. This is followed by specific descriptions of each of the modules, in the order listed above. The end of the manual includes a list of the accessories which may be used with the unit.

The ASSOCIATE® complies with the safety standards as described in the international norm: IEC 60601-1 class 1 type BF. The unit complies with IEC-60601-1-2.

1.2 Description of this manual

The purpose of this manual is to provide the field engineer with the necessary information to maintain and repair the ASSOCIATE®.

1.3 Warranty

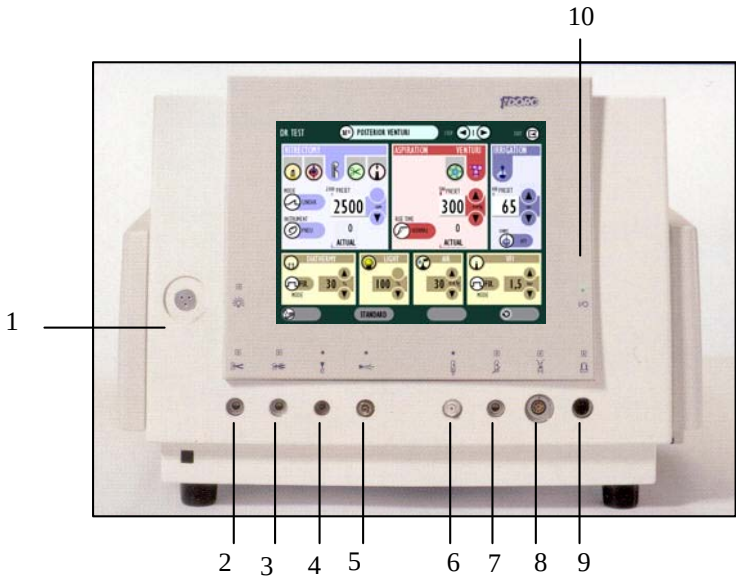
D.O.R.C. International b.v. warrants that all possible care was used in the choice of materials and manufacture of its products.

D.O.R.C. International b.v. shall not be liable for any incidental or consequential loss, damage or expense, arising from abuse of its products. However, if D.O.R.C. International b.v.'s investigation shows that its products were defective at the time of shipment by D.O.R.C. International b.v., products will be replaced/repaired at no charge.

Otherwise all D.O.R.C. International b.v. equipment is covered with a full year warranty, which does not cover the accessories.

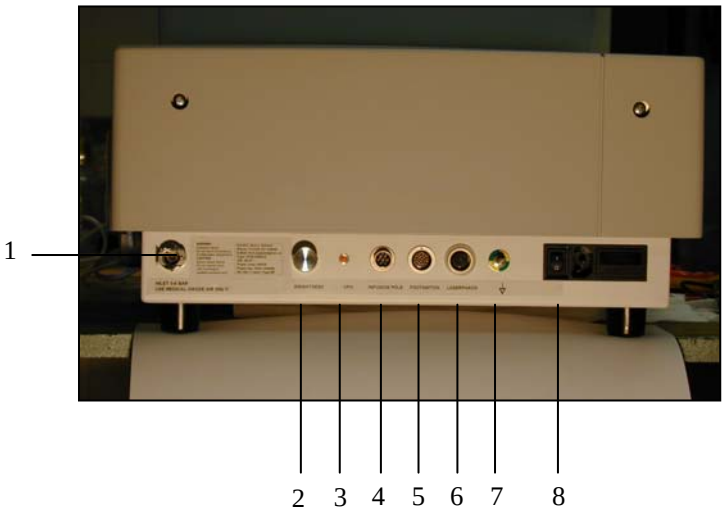
D.O.R.C. International b.v. neither assumes backflush authorizes any other person to assume for it, any other or additional liability or responsibility in connection with its products.

1.4 Description of the unit



1) Triple-port light connector
2) Scissors connector
3) Proportional scissors connector
4) VFI connector
5) Air connector
6) Pneumatic vitrectome connector
7) Electric vitrectome connector
8) Phaco connector
9) Diathermy connector
10) ON/OFF indicator

Fig.2
D.O.R.C. Associate® - Front View



1) Inlet pressure connector
2) Brightness control User Interface
3) VFI+ (to set-up VFI syringe)
4) Infusion pole connector
5) Footswitch connector
6) Auxiliary/Vitrectomy interface connector
7) Earth potential point
8) ON/OFF switch

Fig. 3
D.O.R.C. ASSOCIATE® - Rear View

Handle to release cartridge

Fig.4
D.O.R.C. ASSOCIATE® - Side View

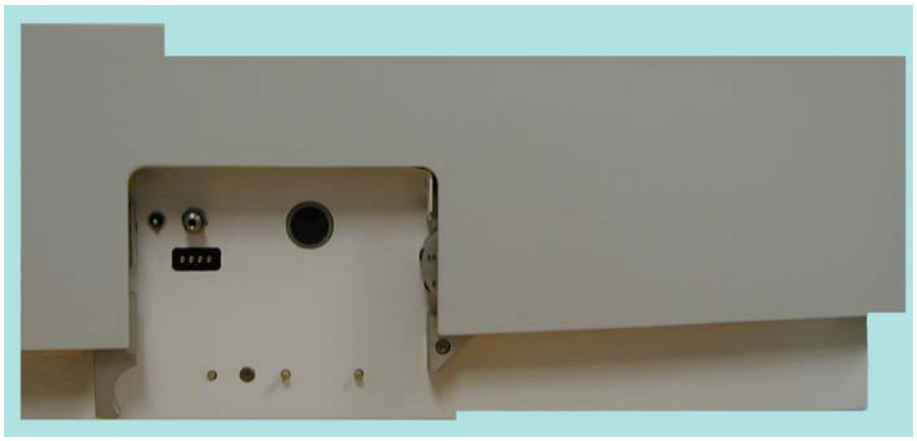


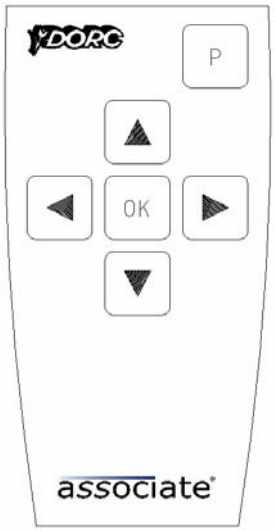
Fig. 5
D.O.R.C. ASSOCIATE® - Side View (without cartridge set in place)

1.5 Description of the footswitch

The unit includes a multi function Footswitch which allows the surgeon to control many different functions on the ASSOCIATE®. For more detailed explanations, see the instruction manual.

Fig. 5
Ergo Footswitch

1.7 Description of the remote control



The ASSOCIATE® is standard supplied with an infra-red remote control to select and control all surgical functions without touching the user's interface screen.

The ASSOCIATE® Remote Control can be placed in a sterile bag to be used in the sterile field for surgeon and/or operating staff.

By depressing the UP/DOWN, LEFT/RIGHT button cursor lights up and is skipping to the next function mode.

Select the requested function mode with the cursor and by depressing the "O.K." button, the selected function will be activated or preset UP/DOWN.

NOTE : the remote control is only functional in the main menu, priming and surgical screens.

Fig. 6
Remote Control

1.8 Audible tones

The ASSOCIATE® can generate audible tones in several different patterns, depending on the functions in use at the time. The volume can be controlled using the system setting screen.

1.9 Specifications

GENERAL

Apparatus	:	ASSOCIATE®
Type :		
Compact Version	:	6600
Dual Version	:	6700
Weight	:	35 Kg.
Dimensions :		
Console	:	50 x 50 x 36 cm.
Display	:	10.1 inch

INPUT

Mains supply	:	100VAC~/120VAC~50/60Hz 230VAC~/240VAC~50/60Hz
Fuses	:	2 x at 100VAC~-120VAC~AT T6,3A 2 x at 230VAC~-240VAC~AT T3,15A
Power consumption	:	600VA (max. ASSOCIATE® Configuration)
Air pressure input (medical grade filtered air !)	:	5-6 BAR / 35-40 lt. Flow (consumption)
Pump	:	Peristaltic or Venturi

I/A MODULE Preset :

Vacuum linear	:	from 0-500 mmHg In case of Peristaltic Pump : also 1-50 cc/min.

VITRECTOMY MODULE :

Pneumatic Cutting range	:	100-2500 cuts/minute linear (+/- 10%)
Electric Cutting range	:	100-1500 cuts/minute linear

SCISSORS MODE :

Scissors Cutting Range	:	60-600 cuts/minute
Proportional Scissors Mode	:	0-100% linear open/close action

PHACO EMULSIFICATION/ FRAGMENTATION MODULE :

Power Consumption	:	50 Watts
Frequency	:	40 kHz
Autotuning		

(The ASSOCIATE® is prepared for a future combination with an Auxiliary Unit)

TRIPLE PORT ILLUMINATION MODULE :

Lamp	:	24V / 150 Watts Halogen bulb, including automatic back-up bulb

DIATHERMY MODULE :

Output	:	(values at room temperature)
RF Output	:	0-7.5 Watts, 100 Ω (1 MHz) loaded, linear and fixed output
Frequency	:	1 MHz, crystal controlled

AIR MODULE :

Air Pressure	:	from 0-120 mmHg.

VFI MODULE :

Pressure	:	from 0.5-5.0 BAR, linear or fixed pressure

VFE MODULE :

Pressure	:	from 10-500 mmHg in case of Peristaltic pump 10-600 mmHg, also 1-50 cc/min. aspiration flow

ENVIRONMENT :

Operation :

a) An ambient temperature range of +10°C to +40°C.
b) A relative humidity range of 10% to 85% without condensation.
c) An atmospheric pressure range of 700 hPa to 1060 hPa.

Transport & Storage Conditions :

a) An ambient temperature range of -40°C to 70°C.
b) A relative humidity range of 10% to 95% without condensation.
c) An atmospheric pressure range of 500 hPa to 1060 hPa.

The D.O.R.C. ASSOCIATE® complies with the safety standards as described in the international standard : IEC 60601-1 class 1 type BF & IEC 60601-2-2.

Section 2 - Theory of Operation

2.1 Block schedule

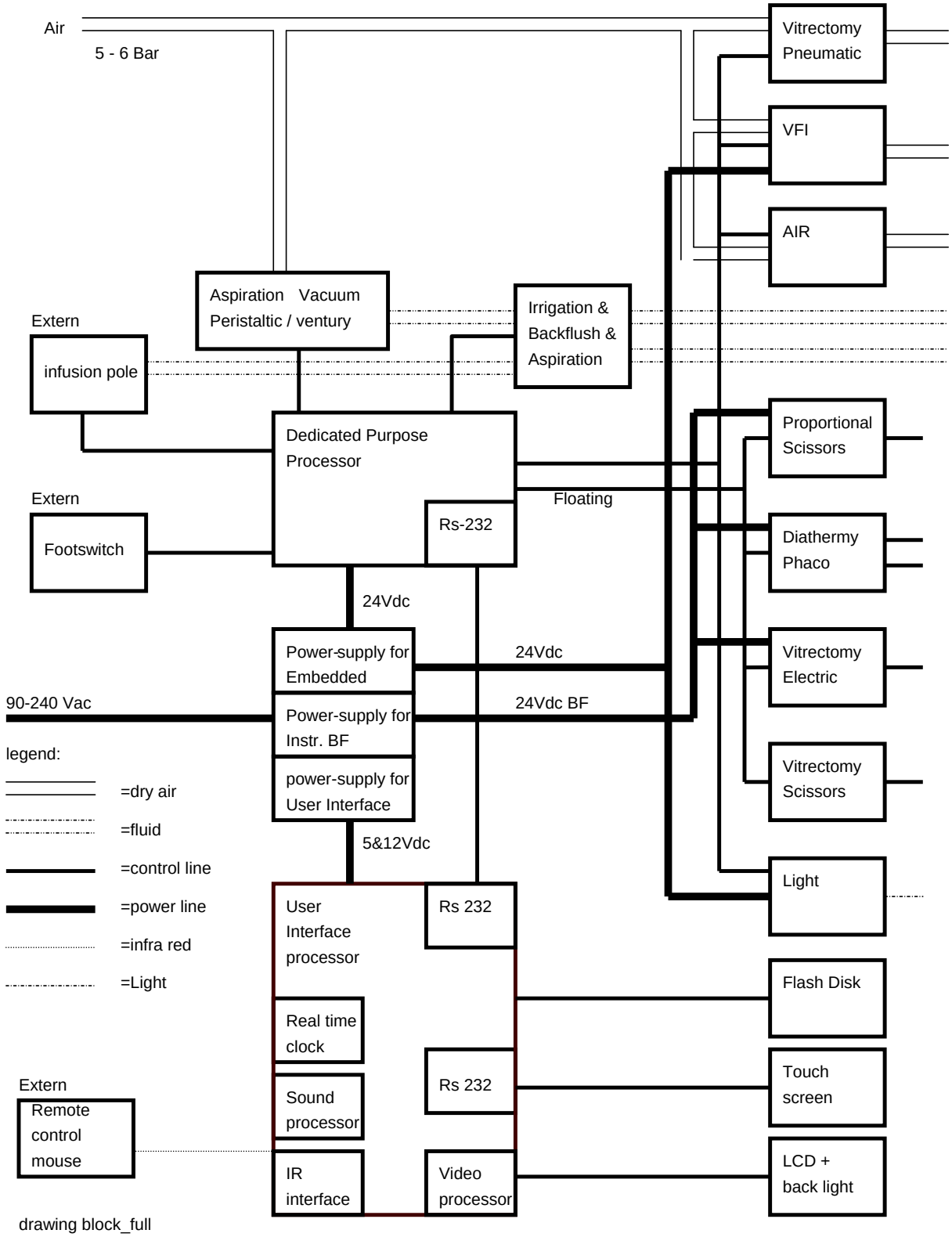


Figure 2.1a illustrates the ASSOCIATE® DUAL in block diagram form. The following sections of this chapter cover in detail the principle of operation of each functional module.

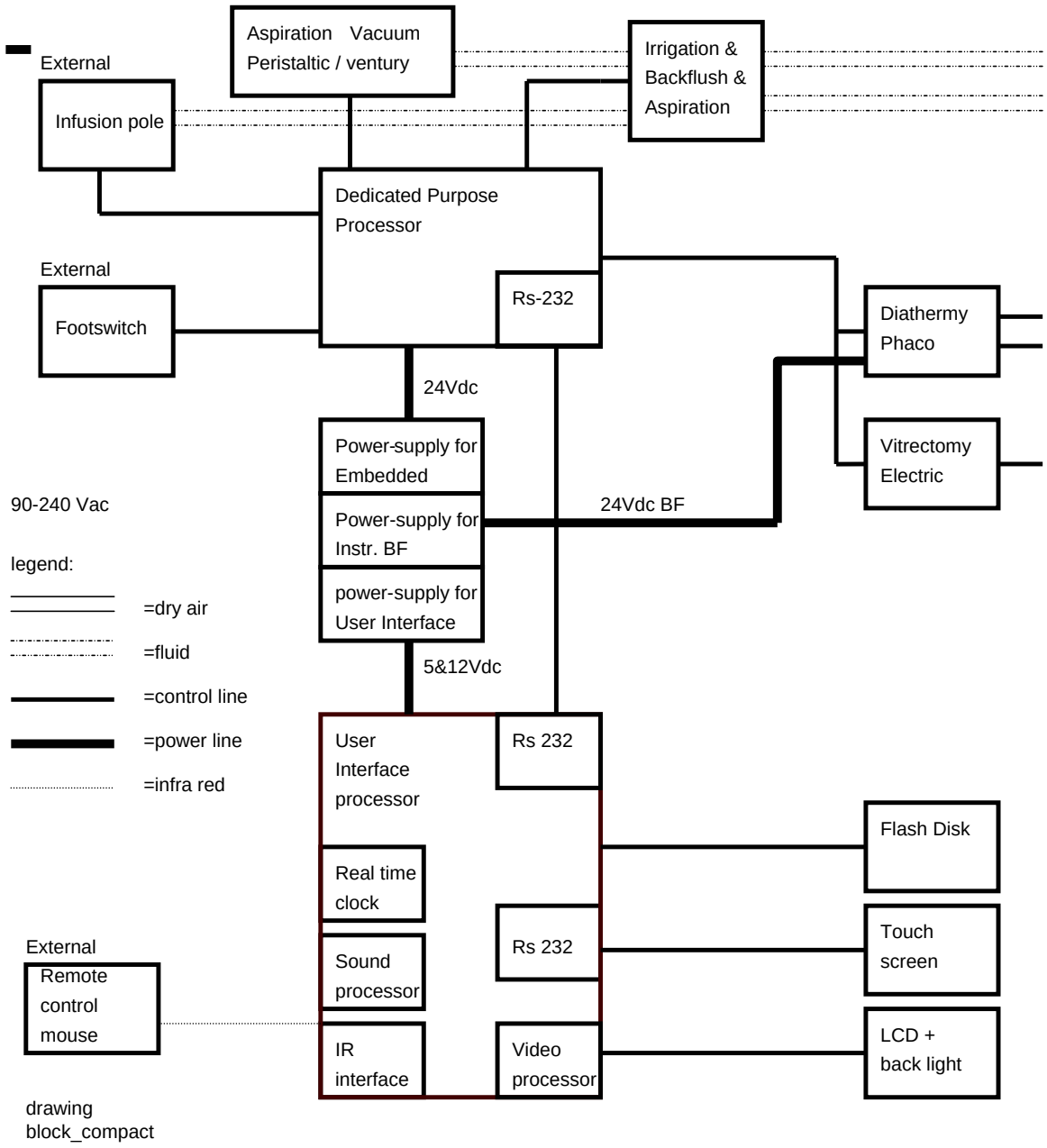


Figure 2.1b illustrates the ASSOCIATE® COMPACT in block diagram form. The following sections of this chapter cover in detail the principle of operation of each functional module.

2.2 User Interface

The ASSOCIATE® provides all necessary functions to perform phaco and vitrectomy surgery. The unit includes nine separate function modules, a remote control and a footswitch.

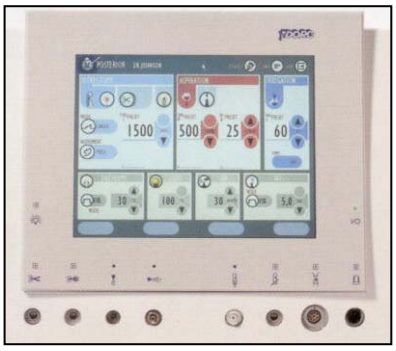
The function modules are :

- Phaco-Emulsification / Fragmentation Module
- Vitrectomy Module
- Scissors Module
- Irrigation/Aspiration Module
- Diathermy Module
- Triple Port Illumination Module
- Air Module
- VFI Module
- VFE Module

These modules may be used together, or combination. Functions of some of the modules are interactive. For example, when the Phaco & Vitrectomy Module is activated, the Irrigation/Aspiration Module is activated as well. A footswitch provides a convenient way of controlling several modules at once.

To provide the ophthalmic surgeon the optimum convenience, the ASSOCIATE® is equipped with a dual pump system, Peristaltic and Venturi selectable for both anterior and posterior surgery. The ASSOCIATE® is prepared for a future combination with an Auxiliary Unit.

Color LCD Display and Touch Screen
The display and touch screen show the icons and buttons with which the user interacts with the system. An icon or button is selected and activated when the user presses that region of the screen where it is displayed. A sterile drape can be used over the touch screen so the ASSOCIATE® can be operated with sterile surgical gloves.



2.3 Description of Phaco

The module can provide linear control of aspiration in combination with both linear, fixed and/or pulsed outputs to a phaco handpiece. This module features continuous auto-tuning. This allows the instrument to maintain constant performance and adjust automatically for changes in loading. When the Phaco-emulsification is activated, the Irrigation/Aspiration Module is also activated.

2.4 Description of Vitrectomy

The Vitrectomy Module provides outputs for electric and pneumatic high speed vitrectomes. Electric outputs can produce a maximum frequency of 1.500 cuts per minute and Pneumatic outputs can produce a maximum frequency of 2.500 cuts per minute. This module can provide linear or fixed control of vitrectomy cutting in combination with linear control of aspiration.

2.5 Description of Irrigation/Aspiration

The I/A mode generates vacuum by a selectable peristaltic or venturi pump.
The I/A mode also provides I/A Min. mode for capsule cleaning, selectable by the ON/OFF switch on the screen.
Constant irrigation ON/OFF is controlled by the ON/OFF switch on the screen or footswitch command. The irrigation flow is regulated by the height of the infusion pole.
The peristaltic pump can produce a maximum vacuum of 500mmHg and max. 50cc/min. flow independently from each other. The Venturi pump can produce a maximum vacuum of 500 mmHg. The upper limit can be selected using the preset control buttons. The actual vacuum level can be controlled up to the maximum, using the Footswitch.

2.6 Description of Diathermy

The Diathermy Module provides selective burn placement for anterior and posterior segment surgery. The diathermy energy is produced by a crystal-controlled solid-state oscillator. The output is regulated so that the diathermy energy remains constant at the preselected value. The output of the Diathermy Module can be controlled in fixed or linear mode by using the footswitch.

2.7 Description of Triple Port Illumination

The Triple Port Illumination Module is intended to provide intraocular illumination during vitreo retinal surgery. The module includes three light source outlets to use three illumination accessories simultaneously. The light output of the source can be controlled using the On/Off switch and the UP/DOWN selector on the screen. The light module will accept a wide range of D.O.R.C. fiber optic accessories.

2.8 Description of Air module

The Air Module provides an automatic air infusion system. The pressure can be selected on the front panel of the module, and is indicated on the screen. The air is delivered to the tubing set through an extended 0.22µ filter to assure sterility. During operations on the posterior segment of the eye which require fluid-gas exchange, the Air Module provides an automatic injection of sterile air at the preset pressure.

2.9 Description of Viscous Fluid Injection module

The V.F.I. (Viscous Fluid Injection) module has to be used with the 1363-D V.F.I. accessory. This section provides a way of fixed or linear controlled injection of viscous fluids. The system can inject viscous fluids with a viscosity of up to 5.000 centistokes.

2.10 Description of Viscous Fluid Extraction Module

The V.F.E. Module generates a vacuum by Venturi or Peristaltic pump which provides aspiration to remove intraocular viscous fluids.

The aspiration source can produce a maximum vacuum of 500 mm Hg. In case of peristaltic aspiration, max. aspiration flow can be set at 50cc/min and 600 mm Hg. The upper limit of the vacuum or aspiration flow can be selected using the preset UP/DOWN buttons. The actual vacuum level can be linear controlled, up to the maximum, using the Footswitch # 9.

Section 3 - Maintenance Instructions

3.1 General Information

Warnings.

Before servicing, please read the information given in the chapter "WARNINGS" of this manual.

Technical assistance
Assistance with servicing is available from D.O.R.C. International Service department either by letter to the following address or by Facsimile or Telephone.

Returns for repair or calibration
To return the equipment to the D.O.R.C. Service Department, a written description including the following information must accompany all returned units:

1. The customer name, address and telephone number.
2. The customer account number.
3. A description of the problem or service desired.
4. The return authorization number.

Returned products should be shipped including footswitch and any handpiece which may be associated with the fault.

Recommended tools and test equipment.

ITEM	*SPECIFICATION*
1. Auto-Ranging Multimeter	Fluke Model 77 or equivalent.
2. Scopemeter	Fluke model 99 or equivalent.
3. Miniature Inspection Light	
4. Inspection mirror	
5. Set of Flat-tip Screwdrivers	
6. RF Voltmeter	DTS600

Introduction and applicability of this manual.
The service manual give the information required to maintain and repair the ASSOCIATE®. In order to understand this manual it is necessary to have a complete understanding of the functions of the ASSOCIATE®. This information can be obtained from the Instruction Manual of the ASSOCIATE®. Usually field service for Phaco module and Diathermy module is limited to swapping the suspected circuit boards, swapping compressed air components, measuring units etc.

Depending on the capabilities of the service facility, some repairs may not possible ; e.g. troubleshooting the main modules of the ASSOCIATE® without proper test equipment and qualified personal. In such cases the defect parts or the complete ASSOCIATE® should be send to D.O.R.C. International b.v.

3.2 Warnings

A warning indicates a potentially harmful situation to yourself or others.

Electric shock hazard
The ASSOCIATE® contains high voltage circuits.

After performing any repair, calibration procedure performs a final electrical safety check and leakage current test.

Unplug the power cord before cleaning or servicing the unit. Should the power cord or plug become cracked, frayed, broken or otherwise damaged, it should be replaced immediately.

Do not touch any exposed wiring or conductive surface, while the cover is off and the unit is energized. The voltages present, when electric power is connected to the ASSOCIATE®, can cause injury or death.

Never wear a grounding wrist strap when working on an energized unit. The operator should now perform any servicing except as specifically stated in the Instruction Manual.

Do not, under any circumstances, perform any testing or maintenance on medical instruments, while they are being used to monitor a patient.

Always turn ASSOCIATE® OFF before cleaning.

Explosion hazard
Never use this ASSOCIATE® in the presence of flammable aesthetics.

EMC between ASSOCIATE® and other devices. It is important to install and use the equipment in accordance with the instruction in order to prevent interference with other devices in the vicinity.

Cautions
A caution indicates a condition that may lead to equipment damage or malfunction.

Electrostatic discharge through the printed circuit boards will damage the components of the ASSOCIATE®. Handle all circuit boards (replacements and defective) by their non-conductive edges and use anti-static containers, when transporting them. Before servicing the equipment, ground yourself and the tool to discharge any accumulated static charge, by wearing a static tool wrist strap. Use hospital-grade grounded receptacle only.

Servicing of this product, in accordance with the Service Manual, should never be undertaken in the absence of proper tools, test equipment and the most recent revision of the Service Manual, which must be clearly and thoroughly understood.

Do NOT apply tension the line cord. Check rear panel voltage setting before connecting the ASSOCIATE® to AC main power.
NEVER IMMERSE THIS UNIT IN LIQUID !!!

3.3 Recommended Spare Parts

D.O.R.C. International b.v. recommends that you keep the following parts on hand. If a problem develops, this will allow you to return the unit to service quickly.

Part no.	Part	Description
1266-A2	Light bulb - Halogen	24V,150 Watt
	Fuse-110/120/230/240VAC~	6,3 A slow-blow
	Fuse-110/120/230/240VAC~	3,15 A slow-blow
	Fuse light 10 amp	
	Fuse Trafo secondary	12 A
	Fuse Trafo secondary	6,3 A
	O-ring	

Table 7 - Recommended Spare Parts

3.4 Periodical Instructions for Preventive Inspection and Maintenance

Periodical instructions for preventive inspection, besides user or operator cleaning instructions (see par. 3.6), are not required.

3.5 Returning the Unit for Repairs

Before returning the unit to D.O.R.C. International b.v. for repairs, please contact the After Sales Department:

After Sales Department
D.O.R.C. International b.v.
Scheijdelveweg 2
3214 VN Zuidland
The Netherlands

Tel : ++31 181 458080
Fax : ++31 181 458090
E-mail : sales@dorc.nl
Web-site : www.dorc.nl

Please try to protect the unit as much as possible during shipping. It is best to use the original packaging if it is available.

3.6 User or Operator Instructions for cleaning the ASSOCIATE®

Before cleaning the ASSOCIATE® disconnect the power cord and let the ASSOCIATE® cool down first. The ASSOCIATE® should only be cleaned with a humid (clean or sterile water) towel.
Be aware of liquid running into the ASSOCIATE®.

3.7 Replacing the Fuses

1.Turn off the power switch on the back of the unit. Unplug the power cord.
2.The fuses are located on the rear of the unit, inside the black box at the point where the power cord is attached. The fuse cover has two tabs. Squeeze these together, and pull the fuse assembly out.
3.Remove the old fuses. Replace them with two new fuses of the same type:

Voltage	Fuse	Dimensions
110/120/VAC~	**6,3 AT (slow blow)**	**5 x 20 mm**
220/240/VAC~	**3,15AT (slow blow)**	**5 x 20 mm**

The fuse type is also listed on the label on the rear of the unit.
4.Plug in the power cord and turn on the power switch on the rear of the unit.
5.Important! If the new fuses fail quickly, there may be something wrong with the unit. Call D.O.R.C. International b.v. for instructions.

3.8 Changing a Halogen Bulb

In the event of a bulb burn-out, the Illuminator icon is indicating :
The illumination mode automatically switches to the second back-up bulb.

NOTE : At the end of the procedure, it is recommended that the burned out bulb is replaced so that a back-up light source is always available.

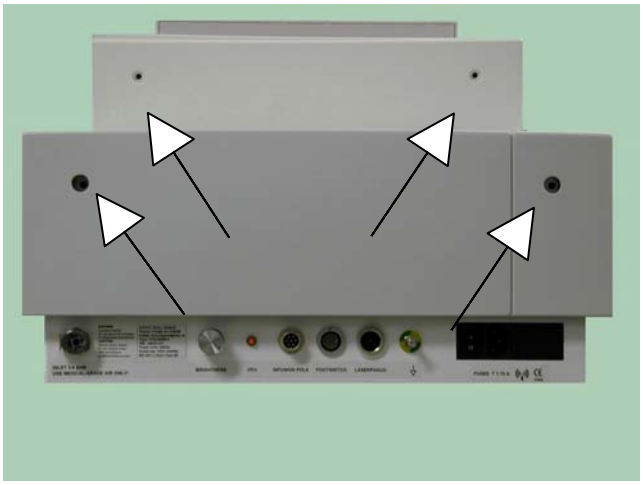
Changing a Halogen Bulb :

1. Unplug the power cord of the ASSOCIATE®. Allow about 5 minutes for the bulb to cool down.
2. Open cover-lid on the left monitor side.
3. Turn inner protection cover to the left to enter light module.
4. Remove the defective bulb excentric from the optical system.
5. Install a new halogen bulb (24 Volt/150 Watt)
6. Close protection cover and cover lid.
7. Plug-in the power cord again.

Warning !
The halogen bulbs used in this unit become very hot when the unit is operating. Before changing the bulb, shut OFF the unit and allow at least 5 minutes for the bulb to cool down. Never touch a hot bulb with your bare fingers. Don't wear vinyl gloves when working with a hot bulb.

Caution !
Do not touch the mirror and lens near the bulb. Any fingerprints will reduce the amount of light produced by the unit. Remove any fingerprints using a lens cloth and alcohol.

3.9 Disassembly of the Top Cover



Turn the Associate Dual Unit off;
Place the lamp cover in the open position;

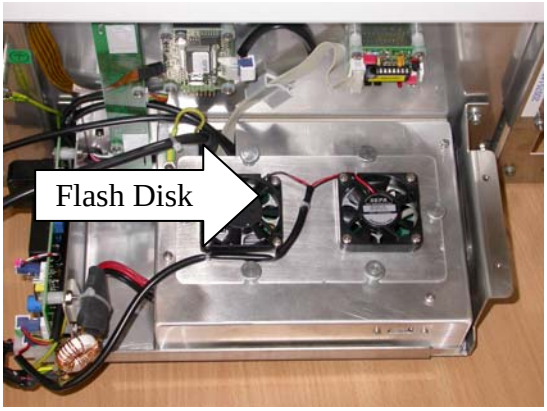
Remove main cover using the large crosshead screwdriver,

Attention: remove the earth cable at the inside.

3.10 Replacing the Harddisk / Flash disk

Installation Upgrade User Interface Software for the Associate Dual Unit.

Tools used: Large crosshead screwdriver;
Small crosshead screwdriver;
PC keyboard with USB connector.

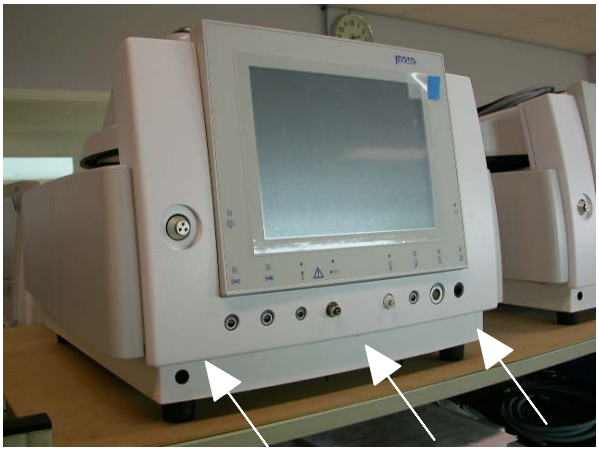


Description installation upgrade software:
Install the upgrade software by exchanging the Flash disk and read the service letter in the supplement.

3.11 Remove the LCD screen

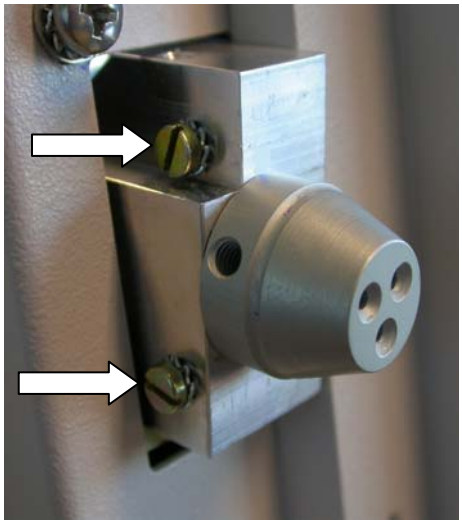
Removing the LCD screen

- Remove the front cover by unscrewing the three screws at the bottom of the front cover, see picture 1.
- Remove the four screws at the left and right side of the screen, see picture 2.
- Remove the two screws at the light module, see picture 3.
- Remove the following cables:
    - Two I/O cables to the embedded board.
    - Power supply cable from the PSU-power supply to the main power supply PCB.(RED)
    - Speaker cable. (GREEN)
    - Brightness cable. (RED)
    - Temperature sensor cable. (BLACK)
    - Front Instruments LEDs cable.
    - Earth cable.

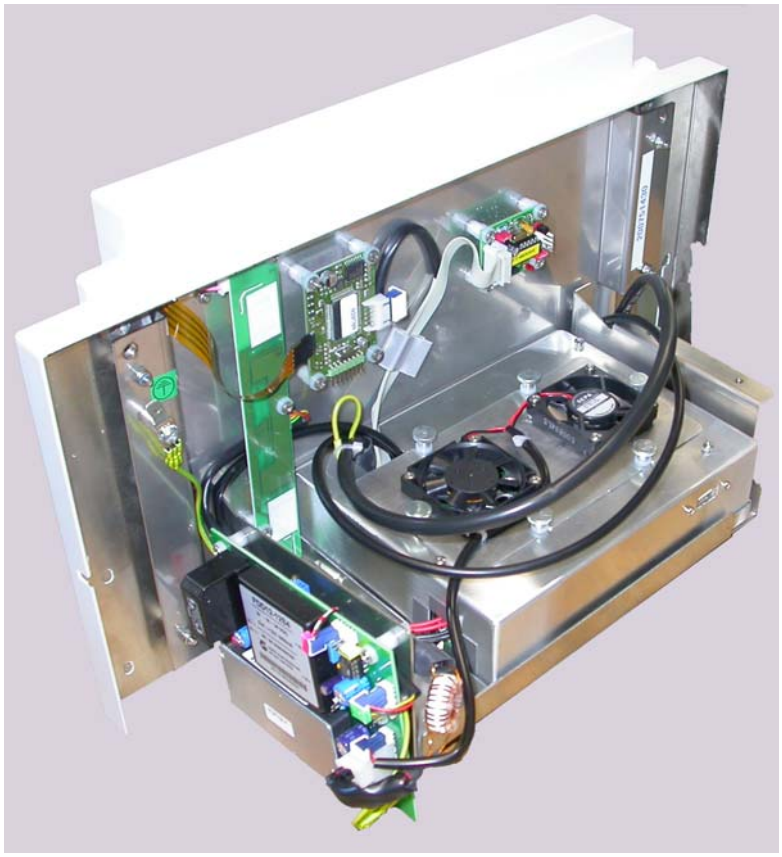


Picture 1.

Picture 2.



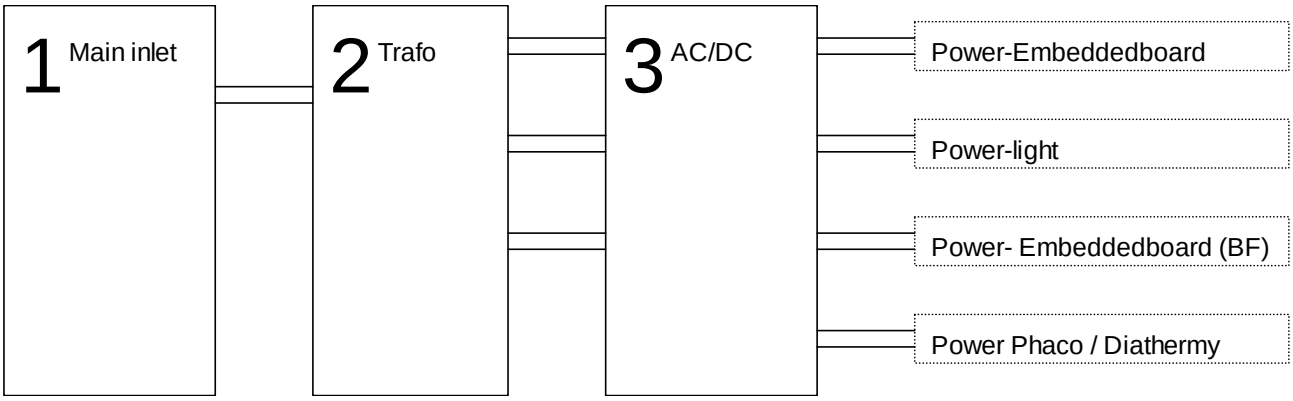
Picture 3.



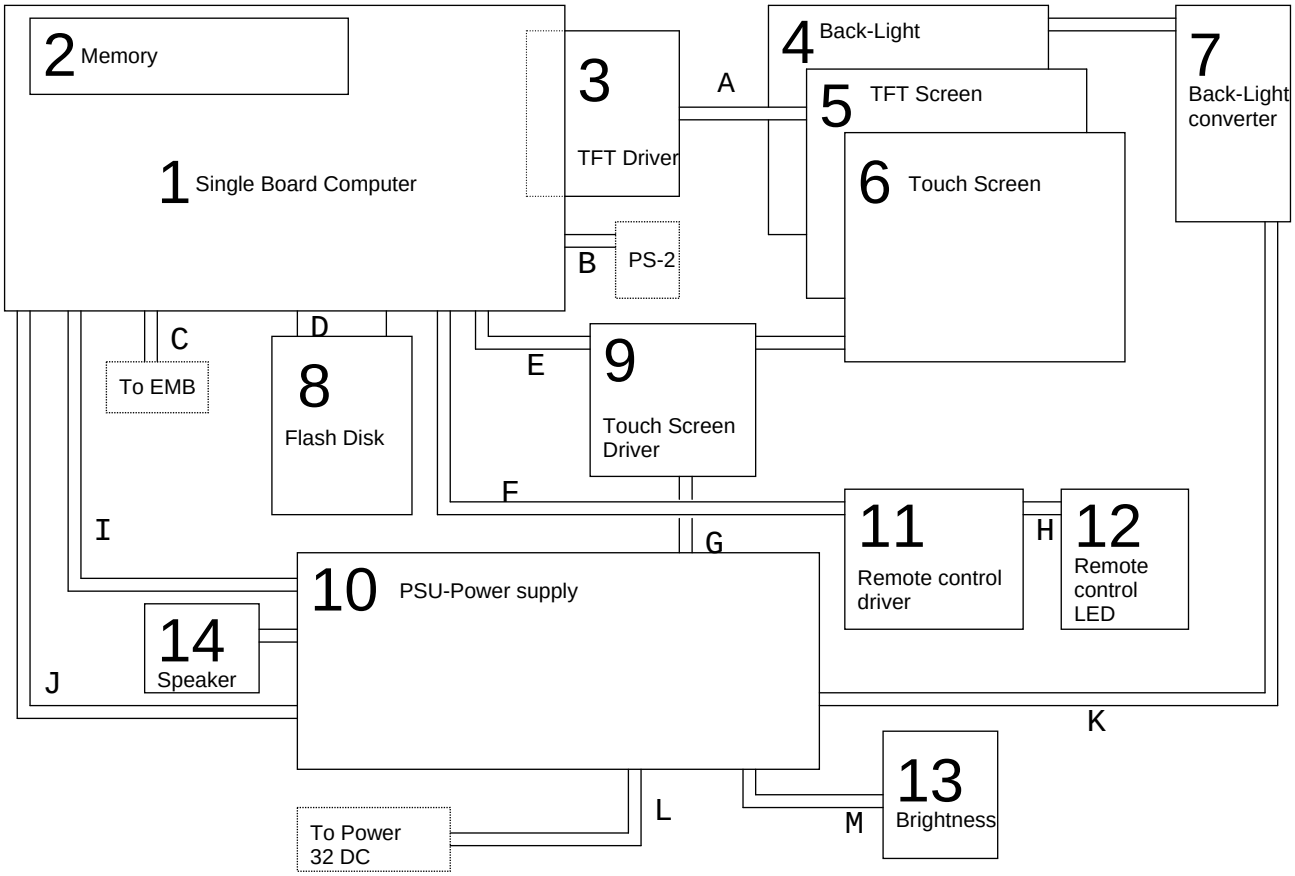
Picture 4.

Section 4 – Schematics

4.0 Block schedule Mains power



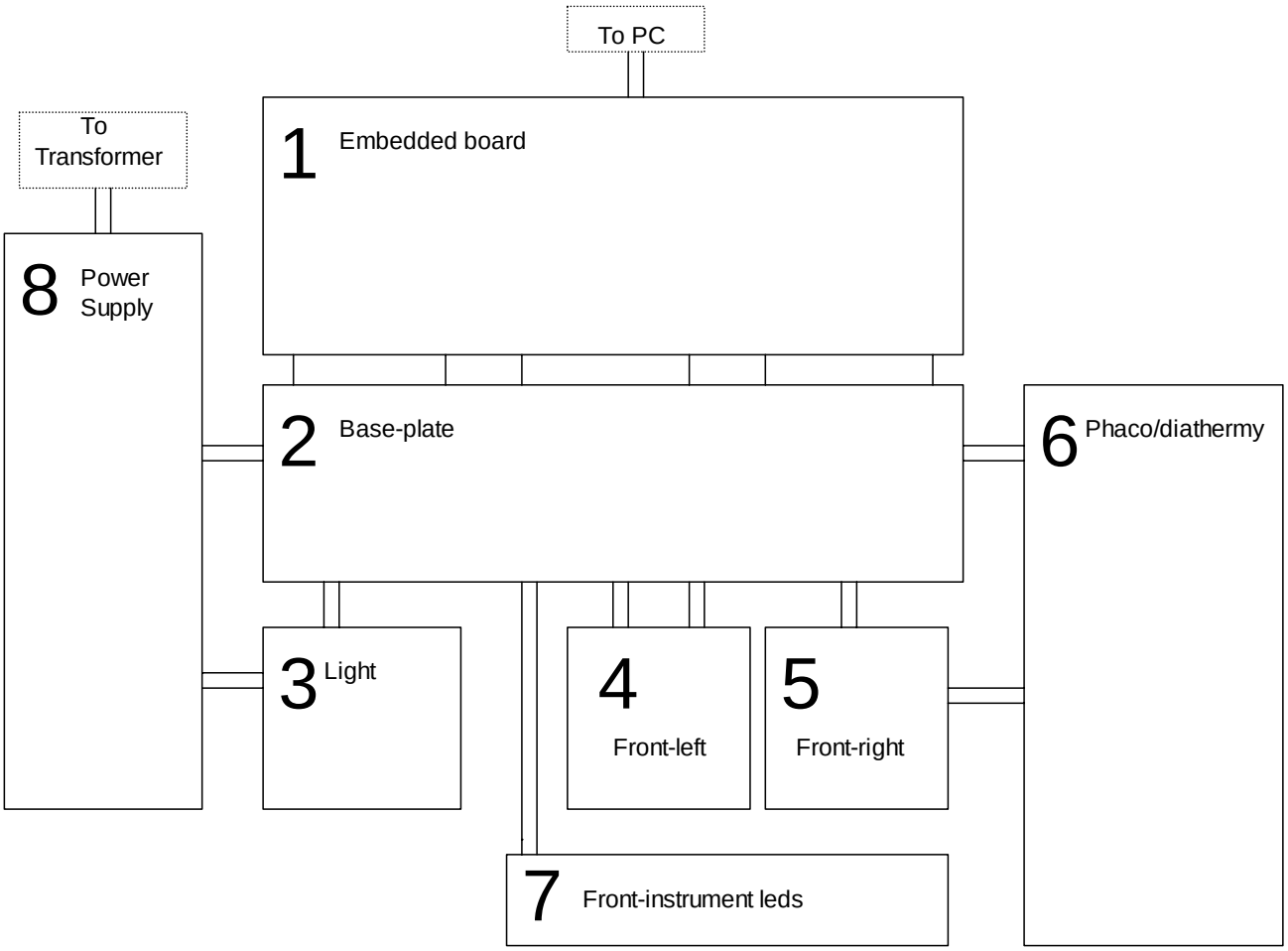
4.1 Block schedule User Interface



Pos. no	Description	Spare part nr.
1	Single Board Computer NT	04600013
	Single Board Computer XP	04600018
2	128 Mb Memory NT	05000270
	512 MB Memory XP	05000277
3	TFT driver NT	04600012
	TFT driver XP	04600019
4	Back-light-tube	Back light tube
5	TFT Screen	06600080
6	Touch screen	06600063
7	Backlight converter	04600011
8	Disk Drive (obsolete)	05000268
	Flash disk 1024Mb	05000276
9	Touch Screen Driver	04600012
10	PSU-Power supply	20614600
11	Remote control driver	04600014
12	Remote control Led	04600016
13	Brightness potmeter	05800208
14	Speaker	08400000
A	Cable TFT driver	04600015
B	Cable NT ps-2	04000101
	Cable XP usb	04000119
C	Cable	20031000/20028800

Pos. no	Description	Spare part nr.
D	44 pin IDE Cable if Disk Drive used.	04000110
E	10 Pol. Flat cable	20031800
F	10 pol. Flat cable	20031700
G	Data cable	20031400
H	Data cable	20031300
I	Audio-cable	20028800
J	Power-cable	20031500
K	Power-cable	20031600
L	Power-cable	20031500
M	Signal cable	20028700

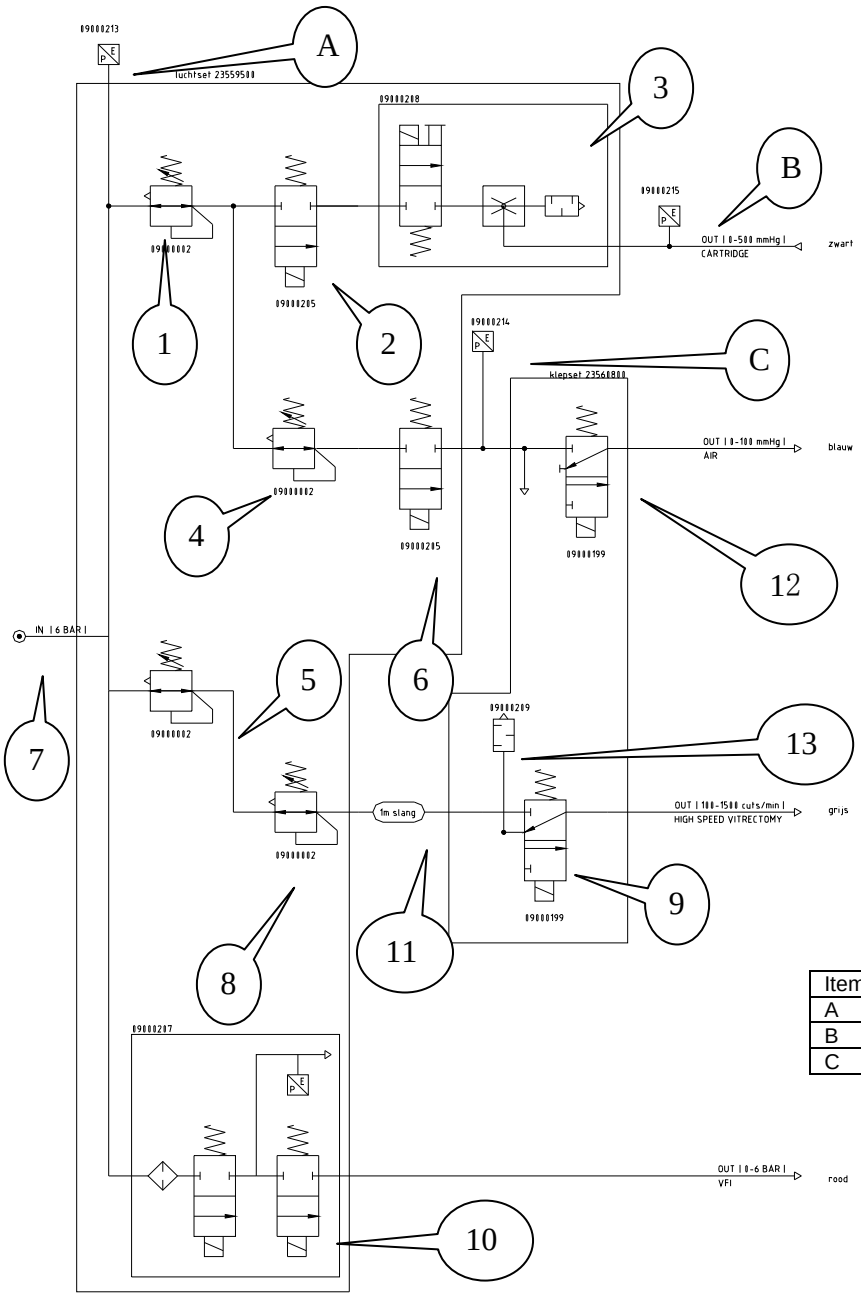
4.2 Block schedule PCB Electronic functions



Item	Description pcb	Part number
1	Embedded board	20615300
2	Base plate	20615100
3	Light	20614800
4	Front print left	20614700
5	Front print right	20614700
6	Phaco/Diathermy	04600010
7	Front Instrument leds	20614500
8	Power supply	20615200

4.3 Block schedule pneumatic

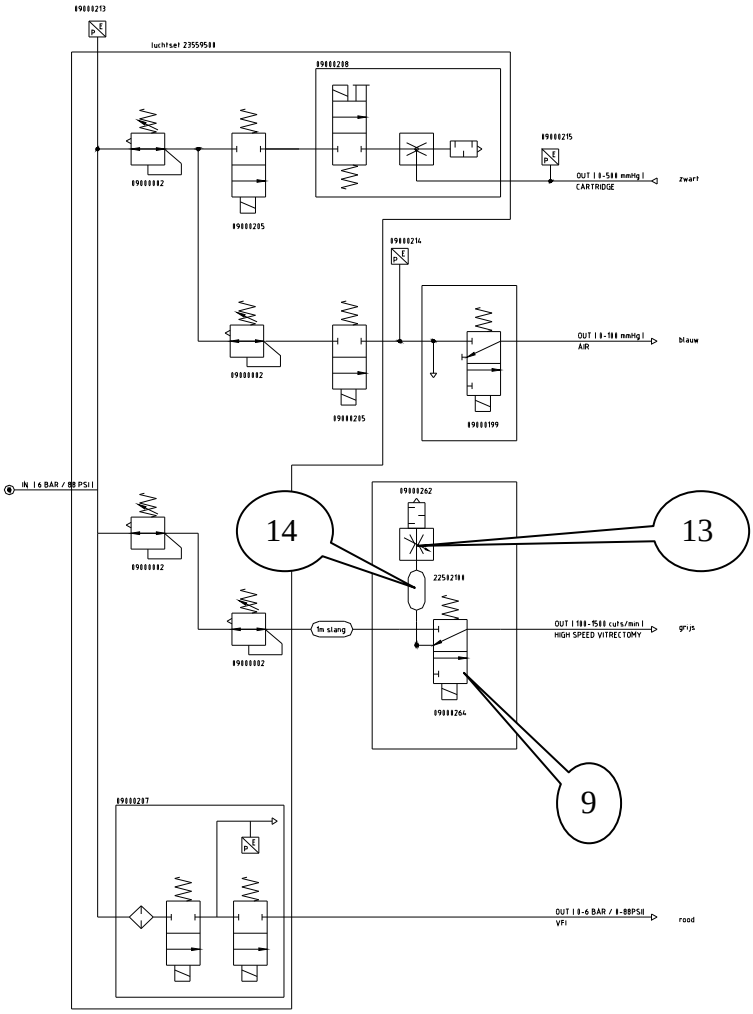
4.3.1 Block schedule pneumatic 1500 cuts



Item	Description sensor	Part number
A	Main pressure	09000214
B	Vacuum	09000215
C	Air	09000213

Item	Description	Part number
1	Main Reducer …PSI	09000002
2	Flow regulator ventury	09000205
3	Vacuum injector	09000208
4	Air reducer … mmHG	09000002
5	Main Reducer … PSI	09000002
6	Flow regulator	09000205
7	Inlet	09000012
8	Pneu. cutter reducer	09000002
9	Pneu. cutter valve to sn	09000199
10	VFI module	09000207
11	Buffer (1000mm)	09000025
12	Safety valve air	09000199
13	Damper	09000209

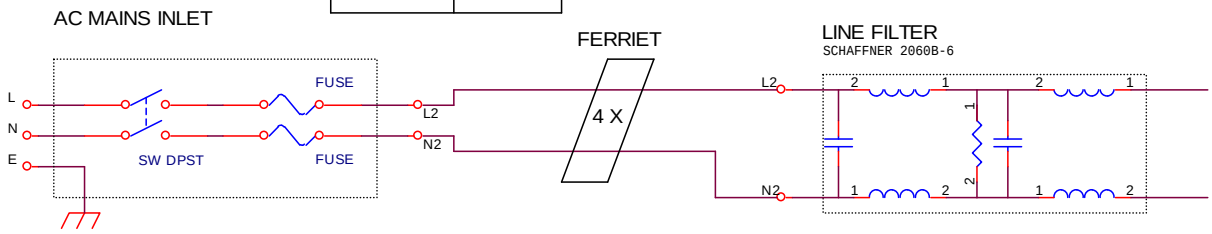
4.3.2 Block schedule pneumatic 2500 cuts

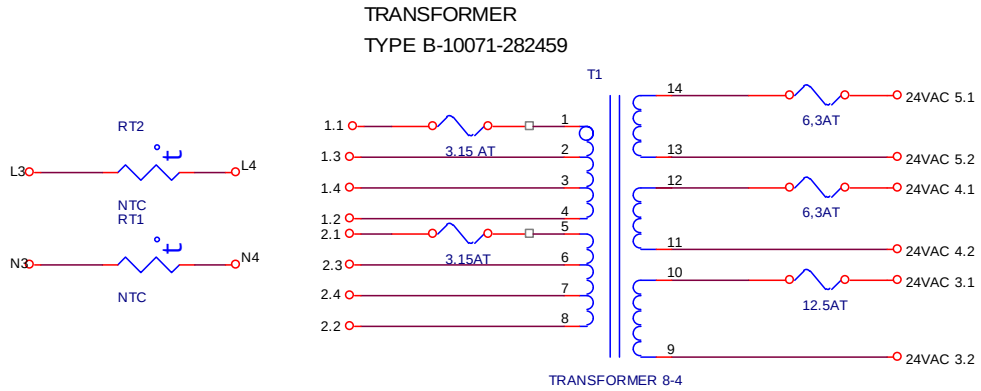


Modification 2500 cuts from sn 200451243		
Item	Description	Part number
9	Pneu. cutter valve	09000264
13	Adjustable damper	09000262
14	Buffer	22502100

4.4 Mains power

FUSES MAINS INLET	
100-115V	6.3 AT
230-240V	3.15 AT

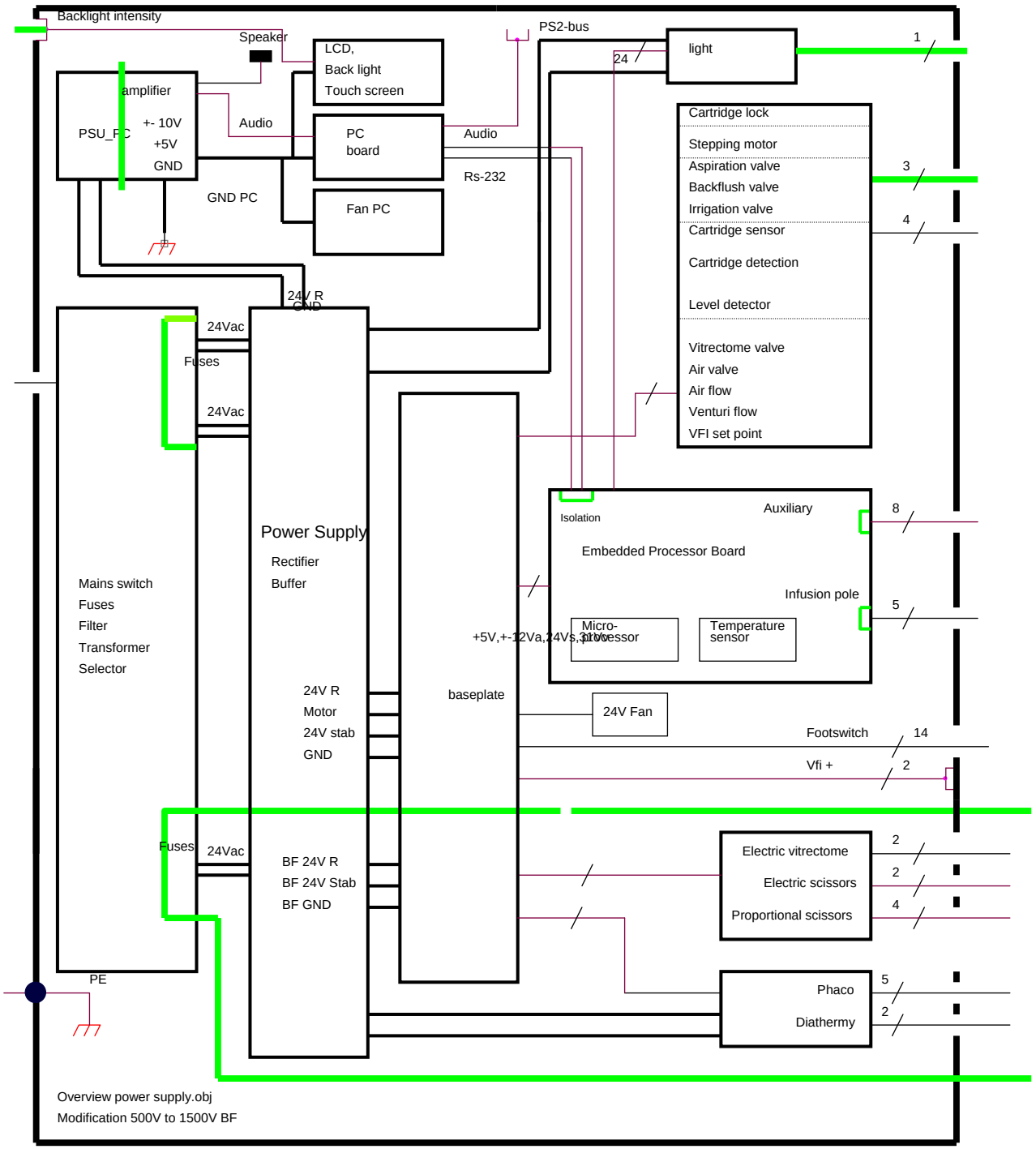




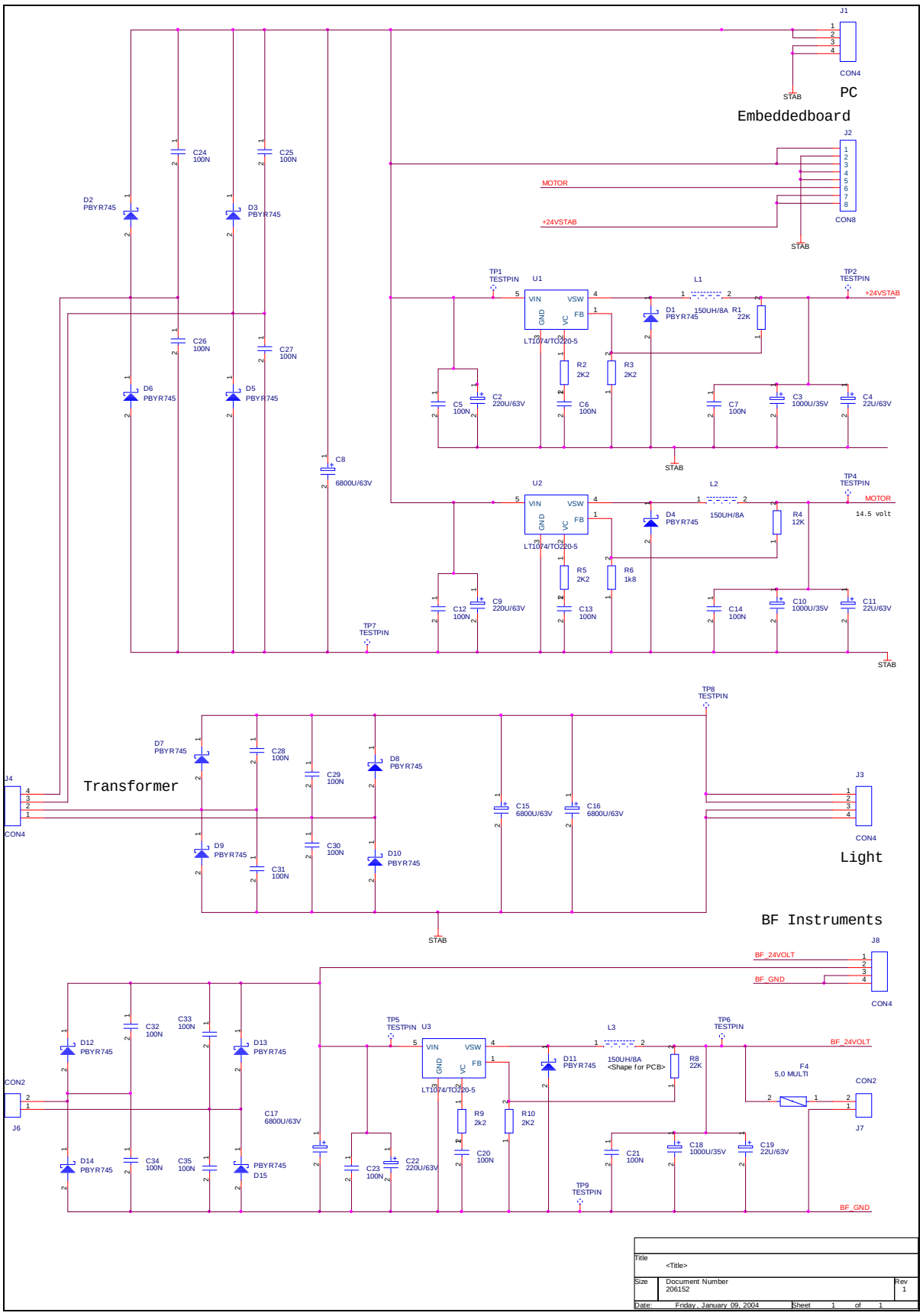
Transformer voltage selector tabel			
Primaire	L4	N4	Connected
100V	1.1	1.3	1.1 - 2.1 and 1.3 - 2.3
115V	1.1	1.4	1.1 - 2.1 and 1.4 - 2.4
230V	1.1	2.4	1.4 - 2.1
240V	1.1	2.3	1.2 - 2.1

Item	Description	Part-list
1	AC Mains inlet	08200064
2	Line Filter	06600081
3	Transformer	08000034
7	NTC	05800254
8	Fuse 3.15AT	06600000
9	Fuse 6,3AT	06600012
11	Fuse 12 AT	06600089

4.5 Overview Power supply



Power supply Embedded board and Instruments (20615100) Rev:1



Connector number	**Description**	
J1	PC	
J2	Embedded board	
J3	Light	
J4	Transformer	
J6	Transformer	BF
J7	Phaco and Diathermy	BF
J8	Embedded board Instruments	BF

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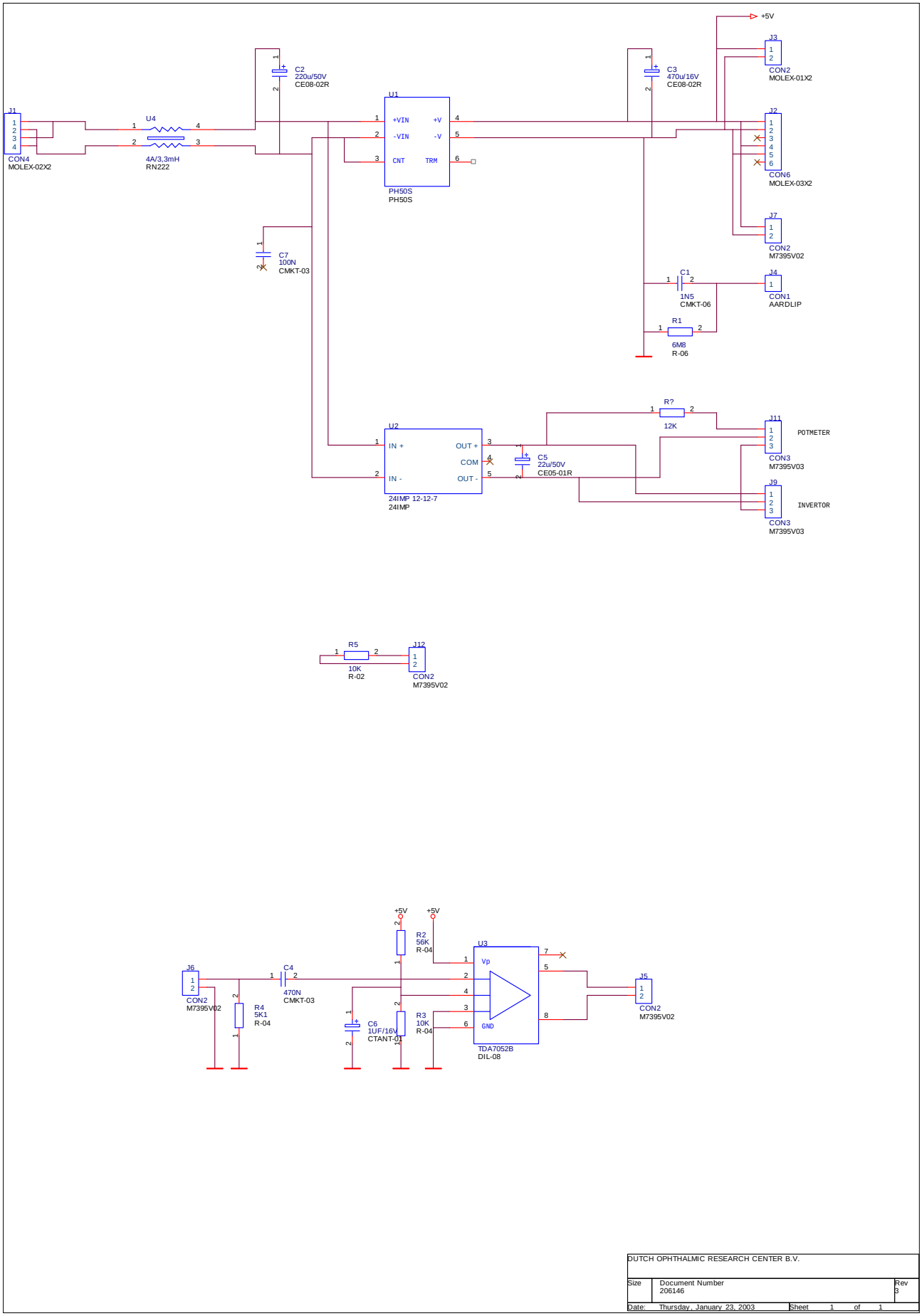
Print 206152 Revision: 01

Item	Quantity	Reference	Part
1	3	C2,C9,C22	220U/63V
2	3	C3,C10,C18	1000U/35V
3	3	C4,C11,C19	22U/63V
4	21	C5,C6,C7,C12,C13,C14,C20, C21,C23,C24,C25,C26,C27, C28,C29,C30,C31,C32,C33, C34,C35	100N
5	4	C8,C15,C16,C17	6800U/63V
6	15	D1,D2,D3,D4,D5,D6,D7,D8, D9,D10,D11,D12,D13,D14, D15	PBYR1645
7	1	F4	5,0 MULTI
8	4	J1,J3,J4,J8	CON4
9	1	J2	CON8
10	2	J6,J7	CON2
11	3	L1,L2,L3	150UH/8A
12	2	R1,R8	22K
13	5	R2,R3,R5,R9,R10	2K2
14	1	R4	12K
15	1	R6	1k8
16	8	TP1,TP2,TP4,TP5,TP6,TP7, TP8,TP9	TESTPIN
17	3	U1,U2,U3	LT1074/TO220-5

4.6 Power supply PC (206146) Rev:3

Connector number	Description
J1	Input 32V
J2	Output 5V (PC)
J3	Output 5V (Optional disk drive)
J4	Earth
J5	Output speaker
J6	Audio in
J7	Output 5 V (Touch screen interface)


+5V
J1
CON4
MOLEX-02X2
U4
4A/3,3mH
RN222
C2
220u/50V
CE08-02R
U1
+VIN
-VIN
CNT
+V
-V
TRM
PH50S
PH50S
C3
470u/16V
CE08-02R
J3
CON2
MOLEX-01X2
J2
CON6
MOLEX-03X2
J7
CON2
M7395V02
C7
100N
CMKT-03
C1
1N5
CMKT-06
J4
CON1
AARDLIP
R1
6M8
R-06
R?
12K
U2
IN +
IN -
OUT +
COM
OUT -
24IMP 12-12-7
24IMP
C5
22u/50V
CE05-01R
J11
POTMETER
CON3
M7395V03
J9
INVERTOR
CON3
M7395V03
R5
10K
R-02
J12
CON2
M7395V02
+5V
+5V
R2
56K
R-04
U3
Vp
GND
TDA7052B
DIL-08
J6
CON2
M7395V02
C4
470N
CMKT-03
R4
5K1
R-04
C6
1UF/16V
CTANT-01
R3
10K
R-04
J5
CON2
M7395V02
DUTCH OPHTHALMIC RESEARCH CENTER B.V.
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Revised: Tuesday, April 16, 2002
206146 Revision: 3

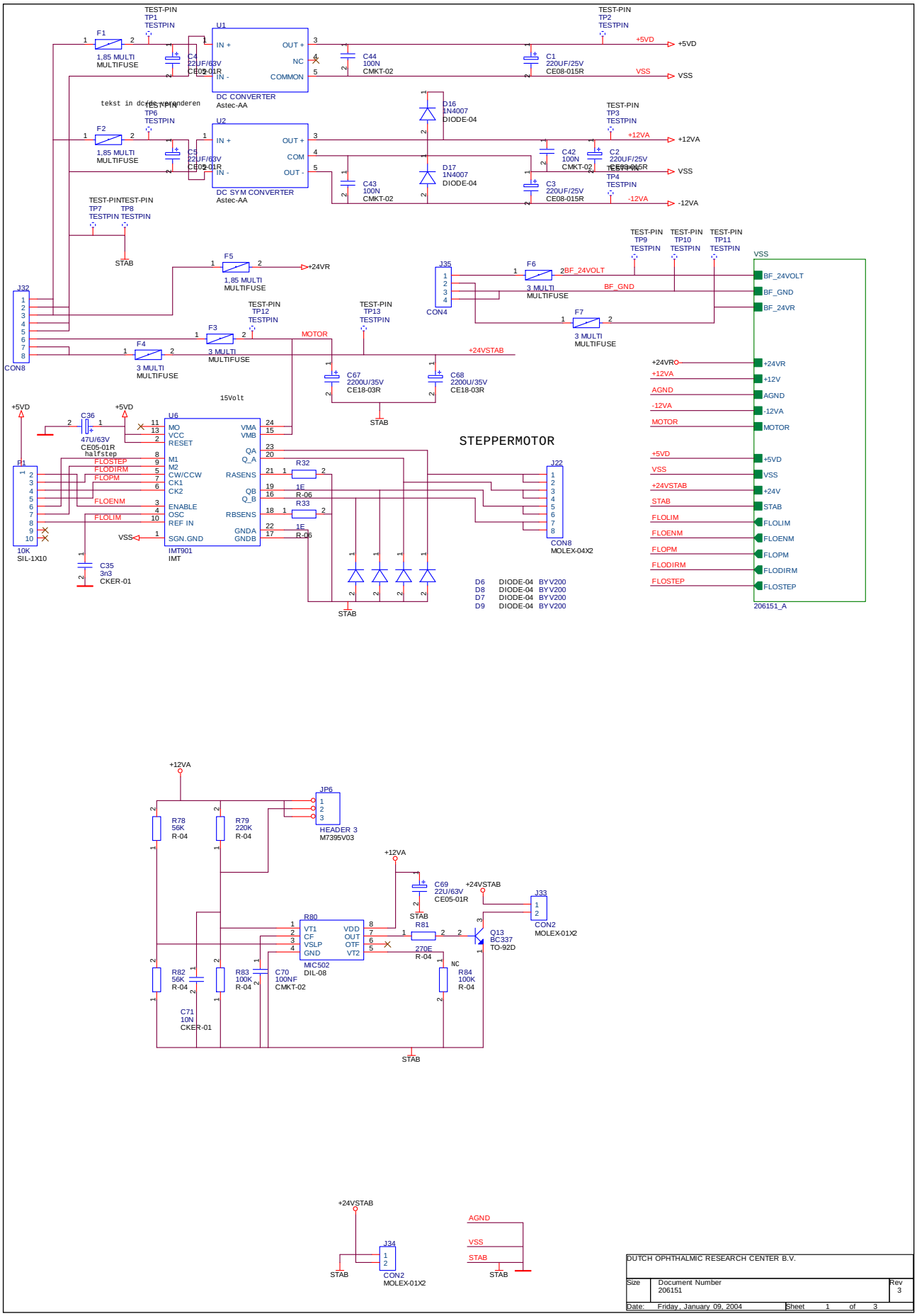
DUTCH OPHTHALMIC RESEARCH CENTER B.V.

Item	Quantity	Reference	Part
1	1	C1	1N5
2	1	C2	220u/50V
3	1	C3	470u/16V
4	1	C4	470N
5	1	C5	22u/50V
6	1	C6	1UF/16V
7	1	C7	100N
8	1	J1	CON4
9	1	J2	CON6
10	5	J3,J5,J6,J7,J12	CON2
11	1	J4	CON1
12	2	J9,J11	CON3
13	1	R?	12K
14	1	R1	6M8
15	1	R2	56K
16	2	R3,R5	10K
17	1	R4	5K1
18	1	U1	PH50S
19	1	U2	24IMP 12-12-7
20	1	U3	TDA7052B
21	1	U4	4A/3,3mH

4.7 baseplate embedded board (206151 Rev:3)

Connector number	**Description**
CN 1-3	Embedded board
J1	Input 32V
J3	Footswitch part.1
J4	Infusion pole
J6	Cartridge sensor
J7	Footswitch part.2
J8	Input VFI +
J9	Electric vitrectome
J12	Aspiration,Backflush,Irrigation valve´s
J13	Cartridge lock
J16	Phaco/Diathermy sign.
J18	Air valve
J19	Power supply to Phaco / Diathermy board
J22	Stepping motor
J23	Vfi, Ventury and Linear air control
J24	Proportional scissors
J25	Main Fan
J26	Pneumatic cutter
J28	Level sensor
J29	Lamp cartridge
JP5	Detector cartridge switch
JP7	Temp sensor
Tp1,5,6,9	+32Volt
Tp2	+5Volt
Tp3	+12Volt
Tp4	-12Volt
Tp7	+24Volt
Tp8	+15Volt (stepping motor and footswitch motor)

•


TEST-PIN TP1 TESTPIN
F1
1,85 MULTI MULTIFUSE
C4 22UF/63V CE05-01R
U1
IN +
IN -
OUT +
NC
COMMON
DC CONVERTER Astec-AA
C44 100N CMKT-02
C1 220UF/25V CE08-015R
TEST-PIN TP2 TESTPIN
+5VD
VSS
tekst in dcdfs veranderen
TEST-PIN TP6 TESTPIN
F2
1,85 MULTI MULTIFUSE
C5 22UF/63V CE05-01R
U2
IN +
IN -
OUT +
COM
OUT -
DC SYM CONVERTER Astec-AA
D16 1N4007 DIODE-04
D17 1N4007 DIODE-04
C43 100N CMKT-02
C42 100N CMKT-02
C2 220UF/25V CE08-015R
C3 220UF/25V CE08-015R
TEST-PIN TP3 TESTPIN
TEST-PIN TP4 TESTPIN
+12VA
-12VA
TEST-PIN TP7 TESTPIN
TEST-PIN TP8 TESTPIN
STAB
J32
CON8
F5
1,85 MULTI MULTIFUSE
+24VR
F3
F4
3 MULTI MULTIFUSE
TEST-PIN TP12 TESTPIN
TEST-PIN TP13 TESTPIN
MOTOR
+24VSTAB
C67 2200U/35V CE18-03R
C68 2200U/35V CE18-03R
J35
CON4
F6
F7
2BF_24VOLT
BF_GND
TEST-PIN TP9 TESTPIN
TEST-PIN TP10 TESTPIN
TEST-PIN TP11 TESTPIN
VSS
BF_24VOLT
BF_GND
BF_24VR
+24VRO
+12VA
AGND
-12VA
MOTOR
+5VD
VSS
+24VSTAB
STAB
FLOLIM
FLOENM
FLOPM
FLODIRM
FLOSTEP
+24VR
+12V
206151_A
15Volt
U6
MO
VCC
RESET
M1
M2
CW/CCW
CK1
CK2
ENABLE
OSC
REF IN
SGN.GND
VMA
VMB
QA
Q_A
RASENS
QB
Q_B
RBSENS
GNDA
GNDB
IMT901
IMT
C36 47U/63V CE05-01R halfstep
C35 3n3 CKER-01
R32
R33
1E R-06
STEPPERMOTOR
J22
CON8
MOLEX-04X2
D6 DIODE-04 BYV200
D8 DIODE-04 BYV200
D7 DIODE-04 BYV200
D9 DIODE-04 BYV200
P1
10K SIL-1X10
FLOSTEP
FLODIRM
FLOPM
FLOENM
FLOLIM
+12VA
JP6
HEADER 3 M7395V03
R78 56K R-04
R79 220K R-04
R80
MIC502 DIL-08
R81 270E R-04
R82 56K R-04
R83 100K R-04
C70 100NF CMKT-02
C71 10N CKER-01
R84 100K R-04
NC
C69 22U/63V CE05-01R
+24VSTAB
J33
CON2 MOLEX-01X2
Q13 BC337 TO-92D
J34
CON2 MOLEX-01X2
AGND
VSS
STAB
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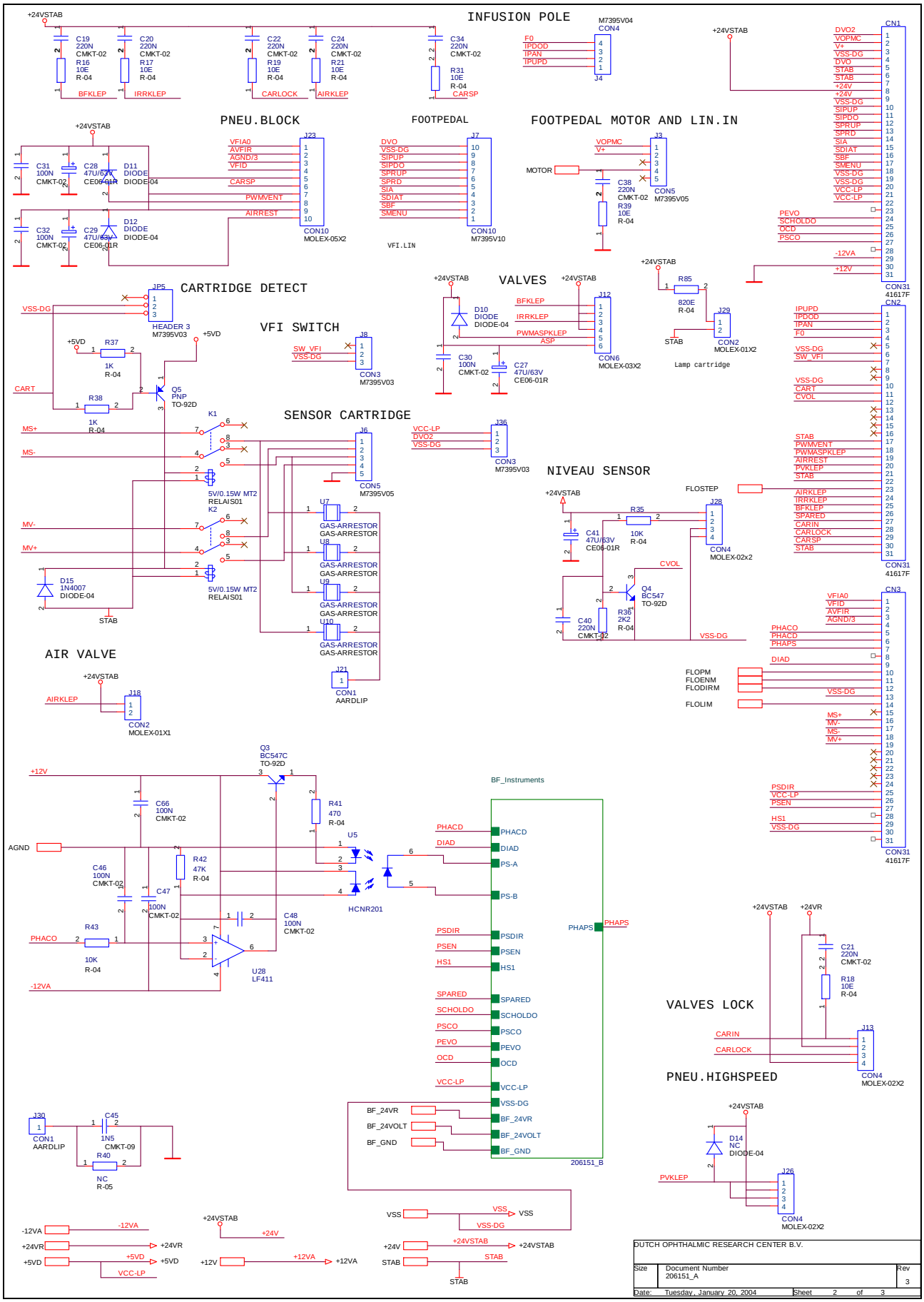
INFUSION POLE
PNEU.BLOCK
FOOTPEDAL
FOOTPEDAL MOTOR AND LIN.IN
CARTRIDGE DETECT
VFI SWITCH
VALVES
SENSOR CARTRIDGE
NIVEAU SENSOR
AIR VALVE
VALVES LOCK
PNEU.HIGHSPEED
BF_Instruments
206151_B
DUTCH OPHTHALMIC RESEARCH CENTER B.V.
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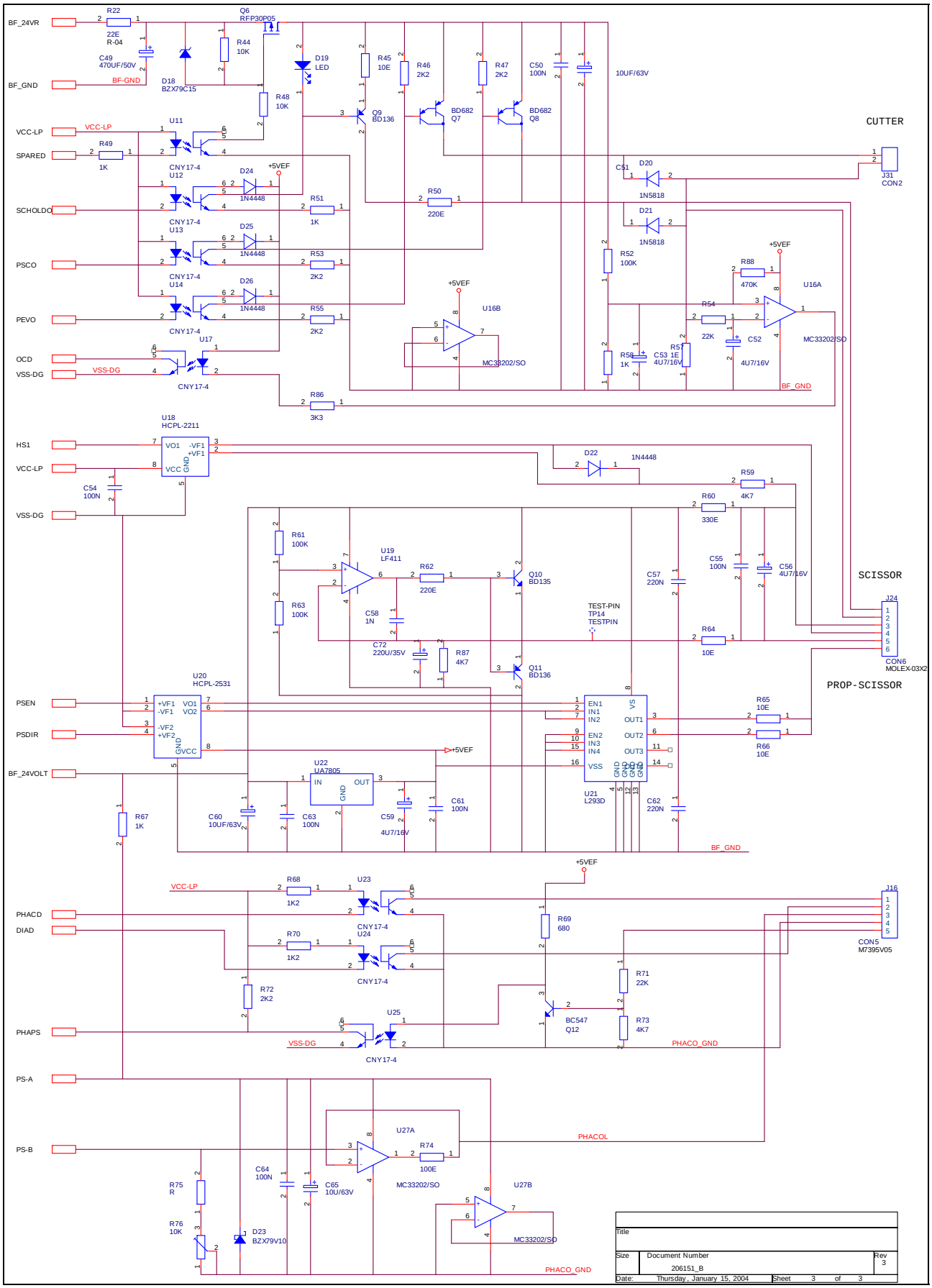
BF_24VR
BF_GND
VCC-LP
SPARED
SCHOLDO
PSCO
PEVO
OCD
VSS-DG
HS1
PSEN
PSDIR
BF_24VOLT
PHACD
DIAD
PHAPS
PS-A
PS-B
CUTTER
SCISSOR
PROP-SCISSOR
+5VEF
BF_GND
PHACO_GND
PHACOL
TEST-PIN
TP14
TESTPIN
MC33202/SO
CNY17-4
HCPL-2211
HCPL-2531
LF411
UA7805
L293D
BC547
BZX79C15
BZX79V10
1N4448
1N5818
BD682
BD136
BD135
CON2
CON6
MOLEX-03X2
CON5
M7395V05
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Revised:
206152 Revision: 3

DUTCH OPHTHALMIC RESEARCH CENTER B.V.

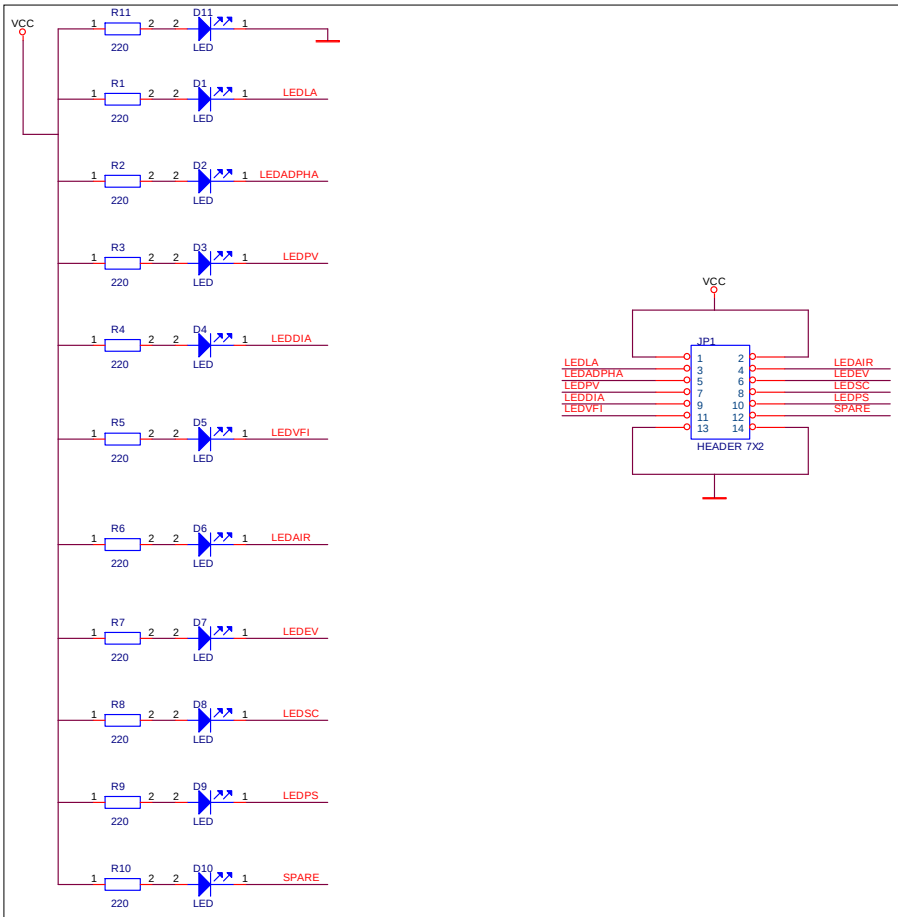
Item	Quantity	Referentie	Part	Type
1	3	CN1,CN2,CN3	CON31	41617/31F
2	3	C1,C2,C3	220UF/25V	EEFVFC1E221
3	2	C4,C5	22UF/63V	ELMA 040
4	10	C19,C20,C21,C22,C24,C34, C38,C40,C57,C62	220N	CMKT
5	5	C27,C28,C29,C36,C41	47U/63V	BC 037 01
6	16	C30,C31,C32,C42,C43,C44, C46,C47,C48,C50,C54,C55, C61,C63,C64,C66	100N	CMKT
7	1	C35	3n3	KER
8	1	C45	1N5	B81123 Y1 MKP
9	1	C49	470UF/50V	FC PANASONIC
10	2	C51,C60	10UF/63V	BC 038 03
11	4	C52,C53,C56,C59	4U7/16V	tantaal
12	1	C58	1N	ker
13	1	C65	10U/63V	BC 038 03
14	2	C68,C67	2200U/35V	FC PANASONIC
15	1	C69	22U/63V	BC 037 01
16	1	C70	100NF	CMKT
17	1	C71	10N	CKER
18	1	C72	220U/35V	FC PANASONIC
19	4	D6,D7,D8,D9	BYV200	BYV. -200
20	3	D10,D11,D12,D14	1N4007	
21	1	R40	NC	
22	3	D15,D16,D17	1N4007	
23	1	D18	BZX79C15	
24	1	D19	LED	3MM GROEN
25	2	D20,D21	1N5818	
26	1	D22	1N4148	
27	1	D23	BZX79V10	
28	3	D24,D25,D26	1N4448	
29	2	F1,F2,F5	1,85 MULTI	MFR185
30	5	F3,F4,F6,F7	4 MULTI	MFR400
31	2	JP6,JP5	HEADER 3	M7395V03 RECHT
32	3	J3,J6,J16	CON5	M7395V05 RECHT
33	5	J4,J13,J26,J28,J35	CON4	MINIFIT MOLEX
	1	J7	CON10	M7395V10 RECHT
34	1	J23	CON10	MINIFIT MOLEX
35	2	J8,J36	CON3	M7395V03 RECHT
36	2	J12,J24	CON6	MINIFIT MOLEX
37	5	J18,J29,J31,J33,J34	CON2	MINIFIT MOLEX
38	2	J21,J30	CON1	AARDLIP
39	2	J32,J22	CON8	MINIFIT MOLEX
40	2	K1,K2	5V/0.15W MT2	SIEMENS V23105/A5301/A201
41	4	R35,R43,R44,R48	10K	SFR25
	1	P1	10K	TRIM BOURNS BOVENZIJDE TYPE W
	1	R76	10K	RSIL 10
42	1	Q3	BC547C	
43	2	Q4,Q12	BC547C	
44	1	Q5	BC557C	
45	1	Q6	RFP30P05	
46	2	Q8,Q7	BD682	

47	2	Q11,Q9	BD238	
48	1	Q10	BD237	
49	1	Q13	BC337	
50	11	R16,R17,R18,R19,R21,R31, R39,R45,R64,R65,R66	10E	SFR25
51	1	R22	22E	3WATH
52	2	R32,R33	1E	3WATH
	1	R57	1E	SFR25
53	6	R36,R46,R47,R53,R55,R72	2K2	SFR25
54	6	R37,R38,R49,R51,R58,R67	1K	SFR25
55	1	R41	470	SFR25
56	1	R42	47K	SFR25
57	1	R50	220E	3WATH
	1	R62	220E	SFR25
58	5	R52,R61,R63,R83,R84	100K	SFR25
59	2	R54,R71	22K	SFR25
60	3	R59,R73,R87	4K7	SFR25
61	1	R60	330E	SFR25
62	2	R70,R68	1K2	SFR25
63	1	R69	680	SFR25
64	1	R74	100E	SFR25
65	1	R75	91K	SFR25
66	2	R82,R78	56K	SFR25
67	1	R79	220K	SFR25
68	1	R80	MIC502	MICREL SEMICONDUCTORS
69	1	R81	270E	SFR25
70	1	R85	820E	SFR25
71	1	R86	3K3	SFR25
72	1	R88	470K	SFR25
73	13	TP1,TP2,TP3,TP4,TP6,TP7, TP8,TP9,TP10,TP11,TP12, TP13,TP14	TESTPIN	
74	1	U1	DC CONVERTER	AA10U-024L-05S
75	1	U2	DC SYM CONVERTER	AA10U-024L-120D
76	1	U5	HCNR201	
77	1	U6	IMT901	
78	4	U7,U8,U9,U10	GAS-ARRESTOR	siemens B88069-X660-S102
79	8	U11,U12,U13,U14,U17,U23, U24,U25	CNY17-4	
80	2	U27,U16	MC33202/SO	
81	1	U18	HCPL-2211	
82	2	U28,U19	LF411CN	
83	1	U20	HCPL-2531	
84	1	U21	L293D	
85	1	U22	UA7805	

4.8 LED-FRAME front

LED-FRAME Revised: Thursday, April 11, 2002
206145 Revision: 1

Item	Quantity	Reference	Part
1	11	D1,D2,D3,D4,D5,D6,D7,D8, D9,D10,D11	LED 3MM GREEN
2	1	JP1	HEADER 7X2
3	11	R1,R2,R3,R4,R5,R6,R7,R8, R9,R10,R11	220



DUTCH OPHTHALMIC RESEARCH CENTER B.V.		
Title: Front Instrumnt leds		
Size	Document Number 206145	Rev 1
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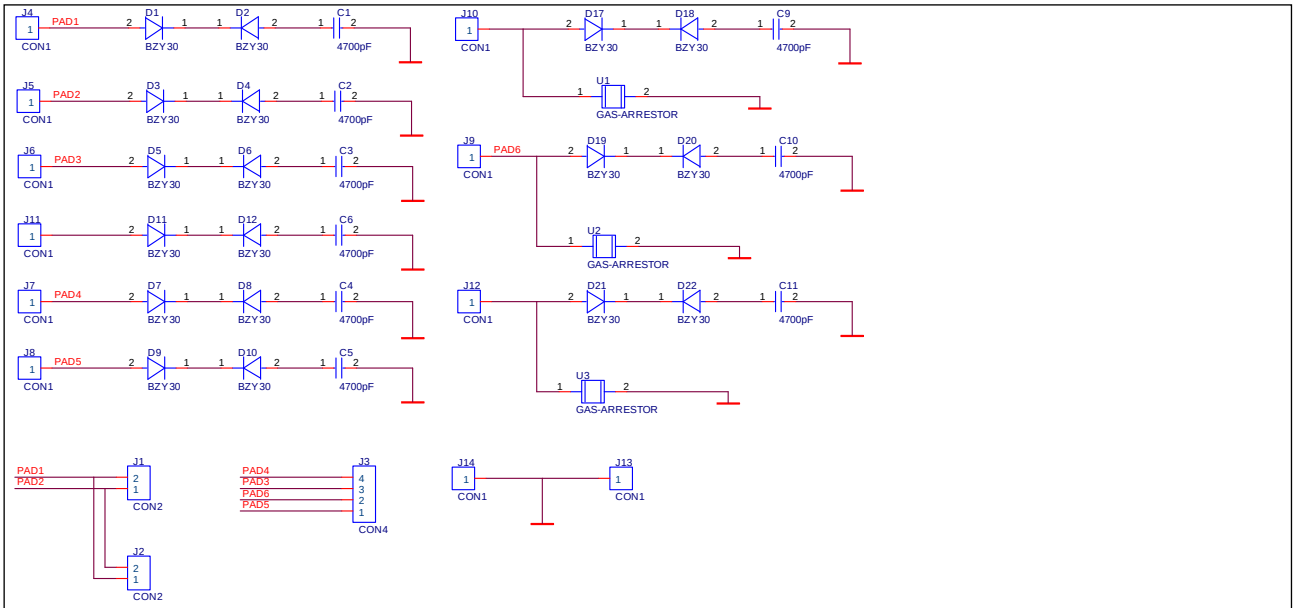
4.9 ESD Front

ESD ABSORBER PRINT Revised: Wednesday, February 27, 2002
206147 Revision: 3

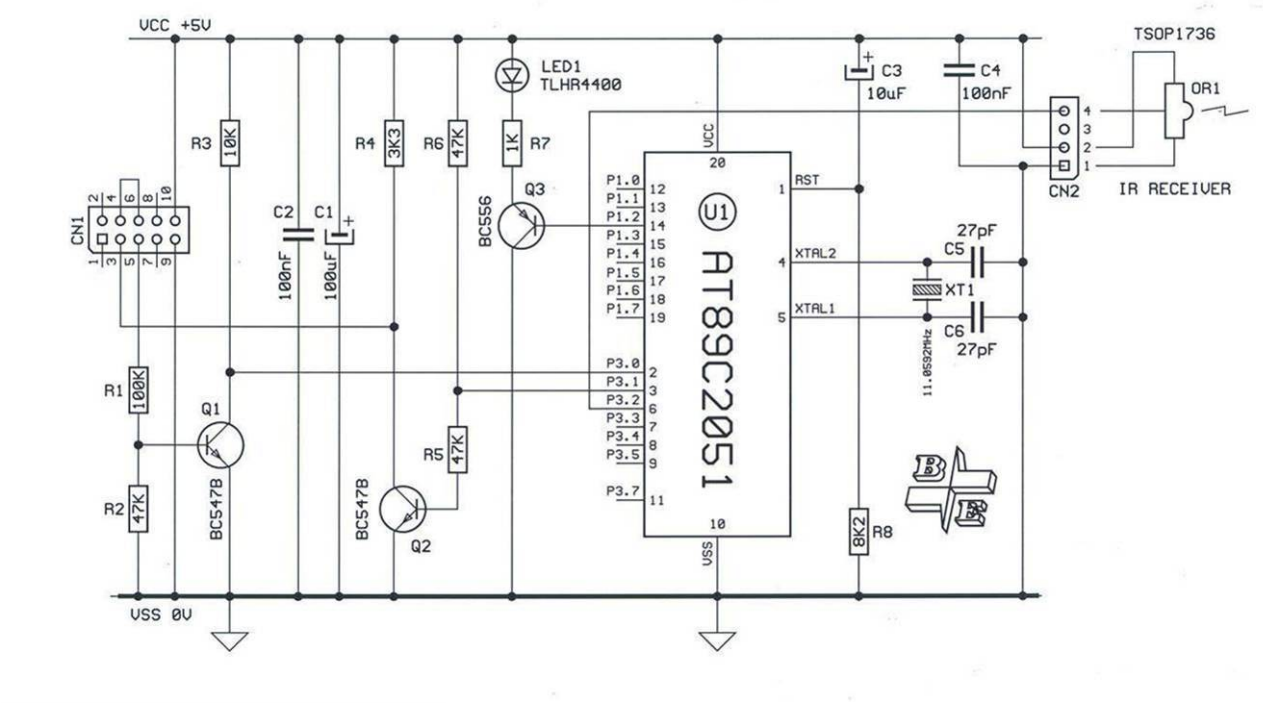
DUTCH OPHTHALMIC RESEARCH CENTER B.V.

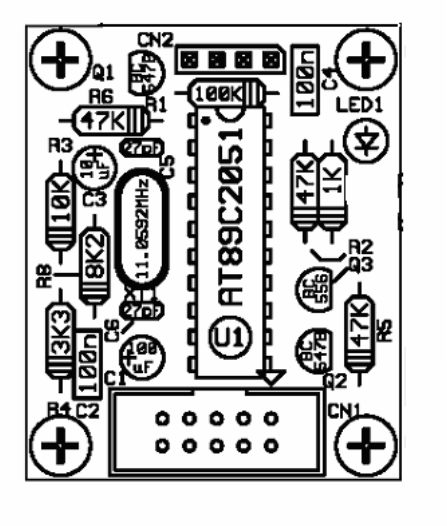
Item	Quantity	Reference	Part
1	9	C1,C2,C3,C4,C5,C6,C9,C10, C11	4700pF
2	18	D1,D2,D3,D4,D5,D6,D7,D8,BZY30 D9,D10,D11,D12,D17,D18, D19,D20,D21,D22	
3	2	J1,J2	CON2
4	1	J3	CON4
5	11	J4,J5,J6,J7,J8,J9,J10, J11,J12,J13,J14	CON1
6	3	U1,U2,U3	GAS-ARRESTOR

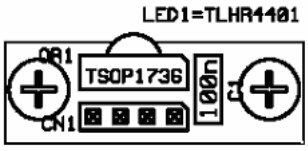


DUTCH OPHTHALMIC RESEARCH CENTER B.V. SCHEIJDELVEWEG 2, ZUIDLAND, HOLLAND		
Title: ESD ABSURBER PRINT		
Size	Document Number 206147	Rev 1
Date: Thursday, January 23, 2003	Sheet 1 of 1	

4.10 Remote control receiver

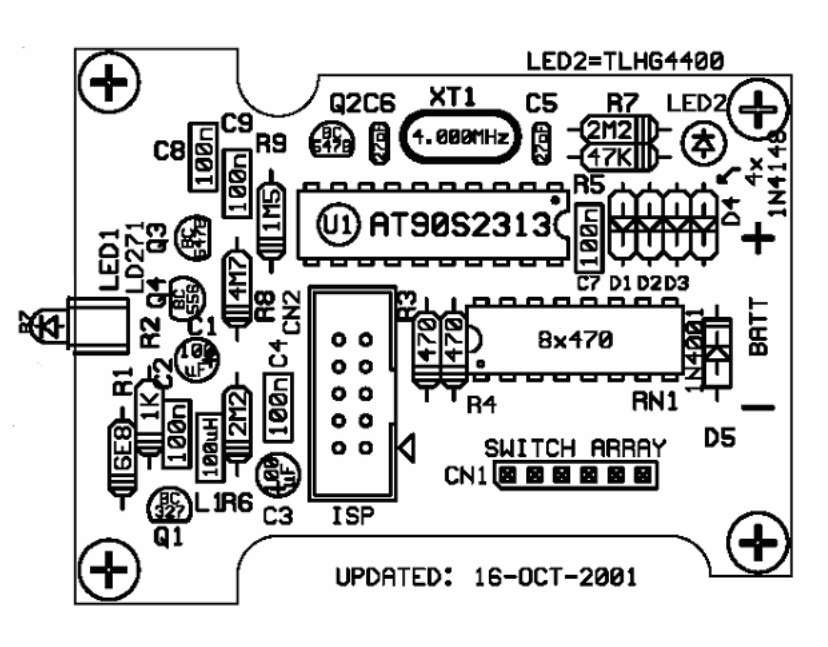


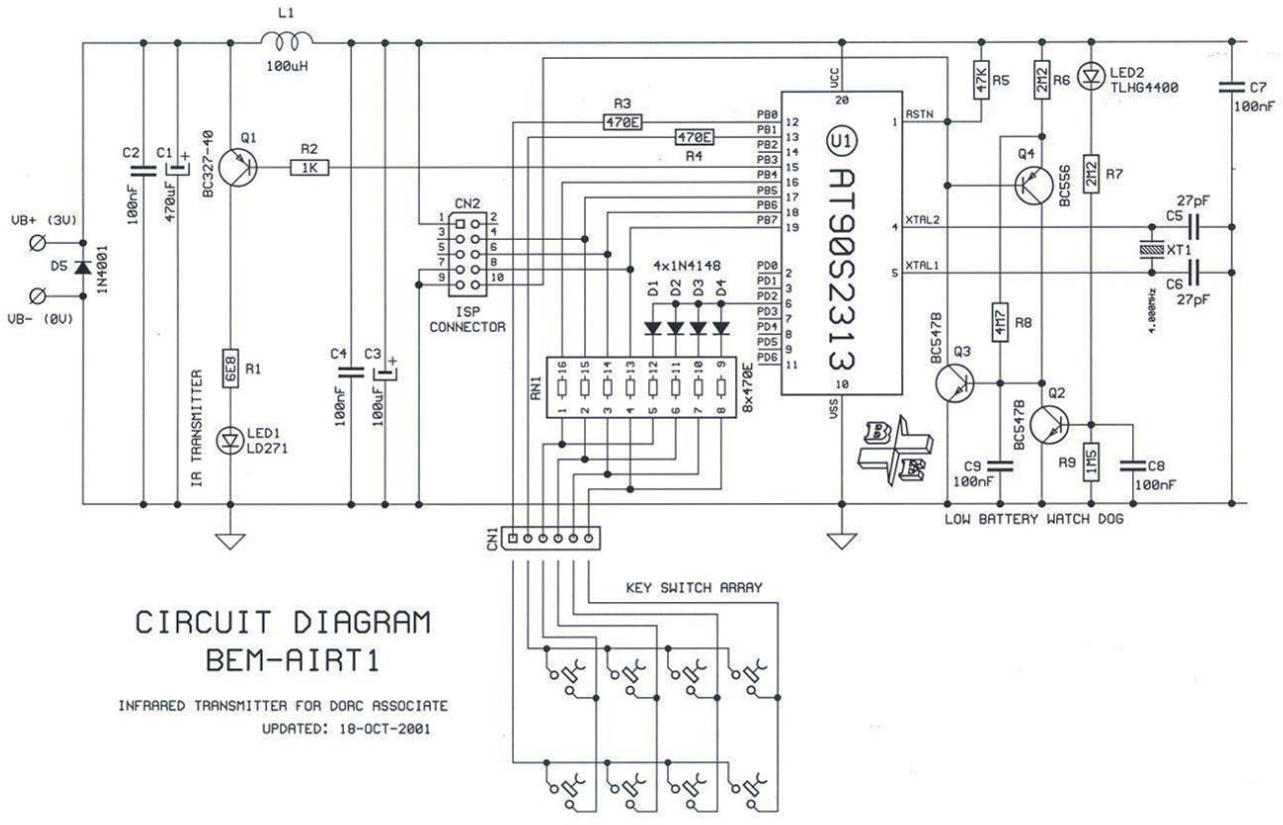




Connector number	Description
CN1	RS232
CN2	LED

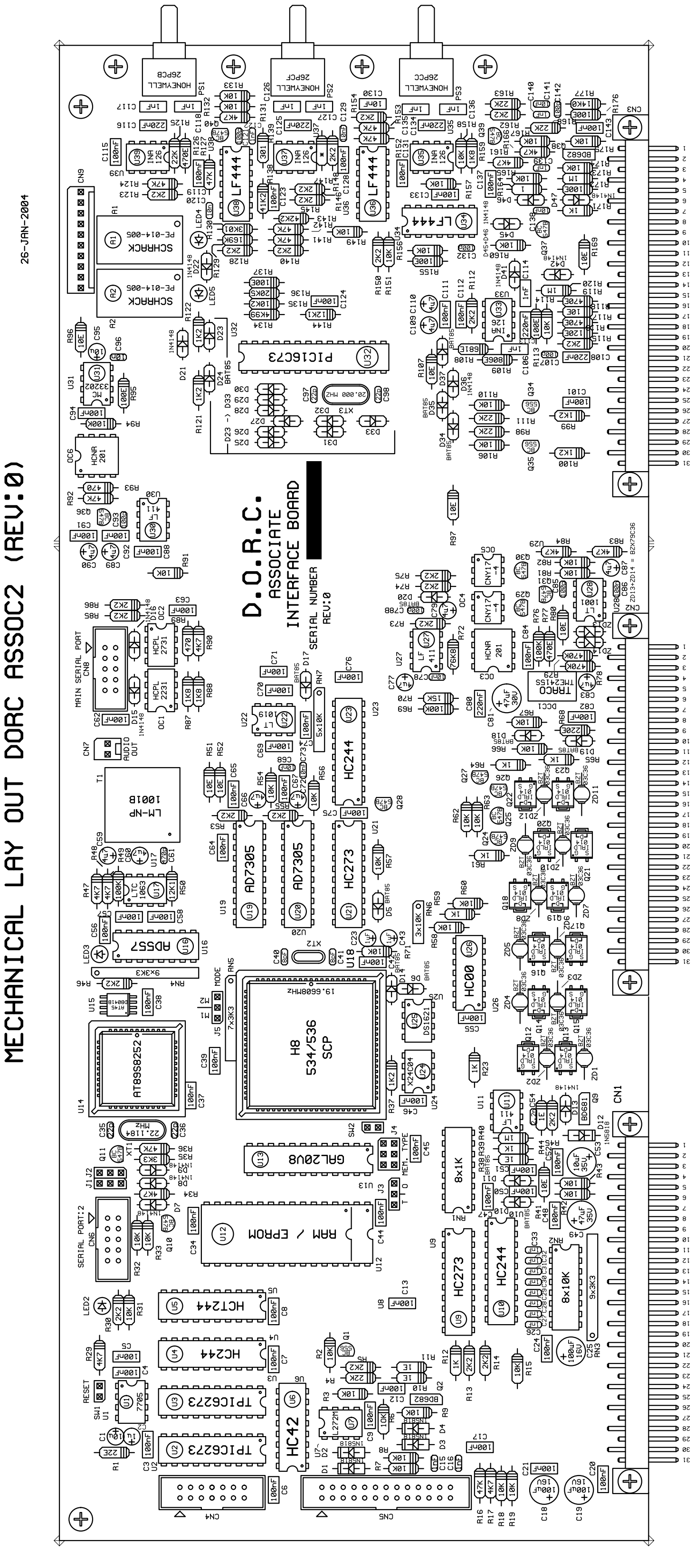
4.11 Remote control transmitter

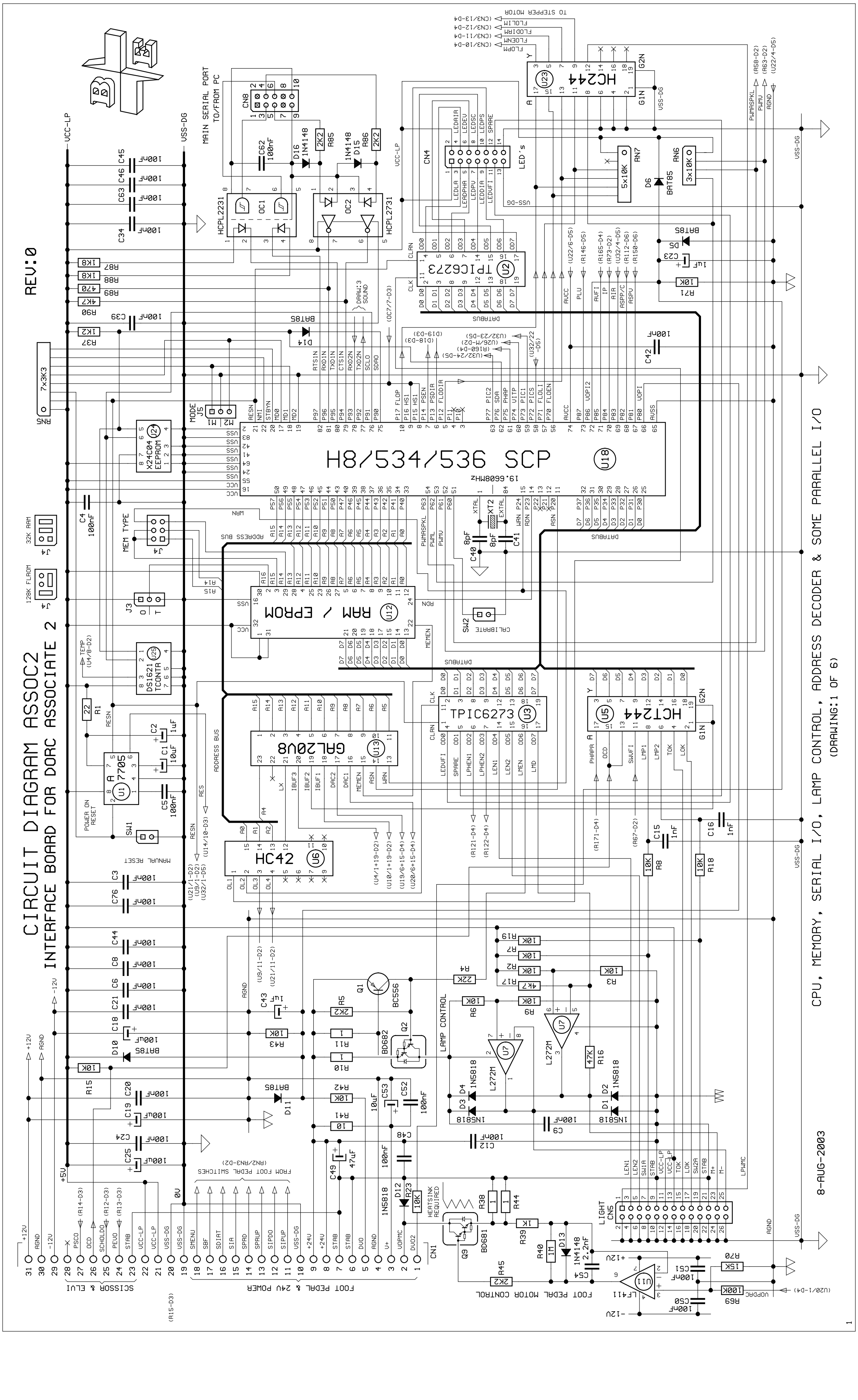


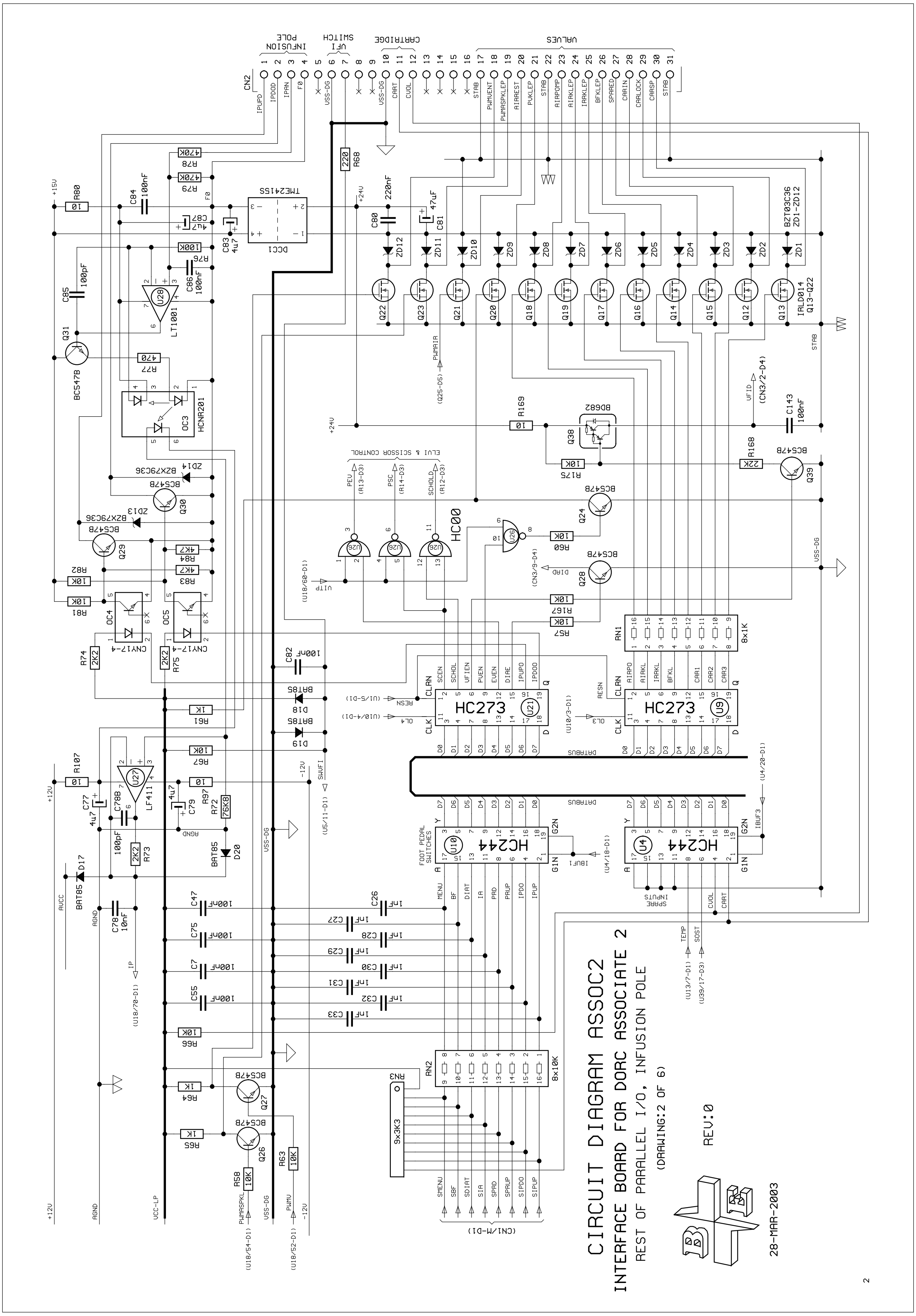


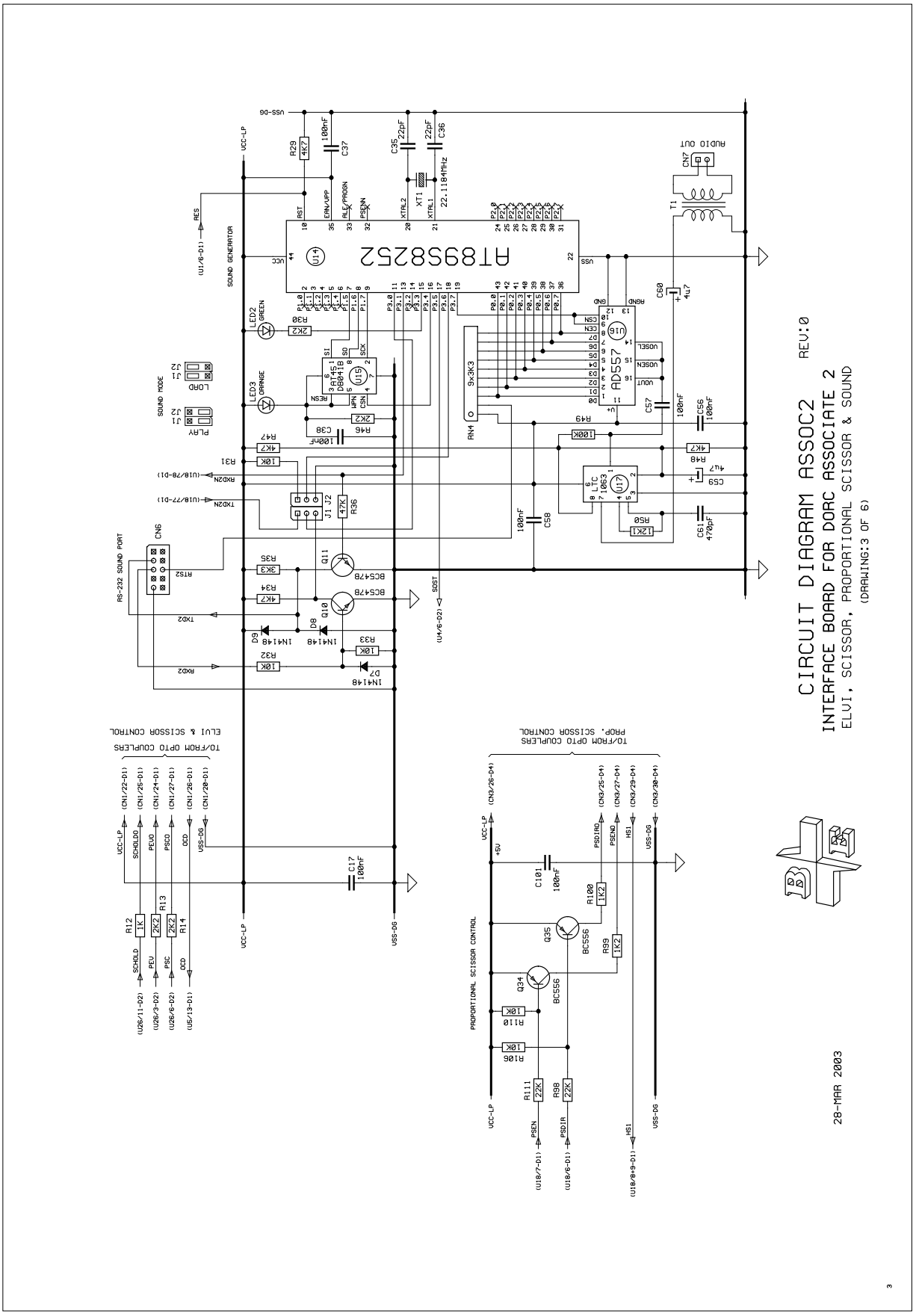
Connector number	Description
CN1	Key switch array
CN2	ISP

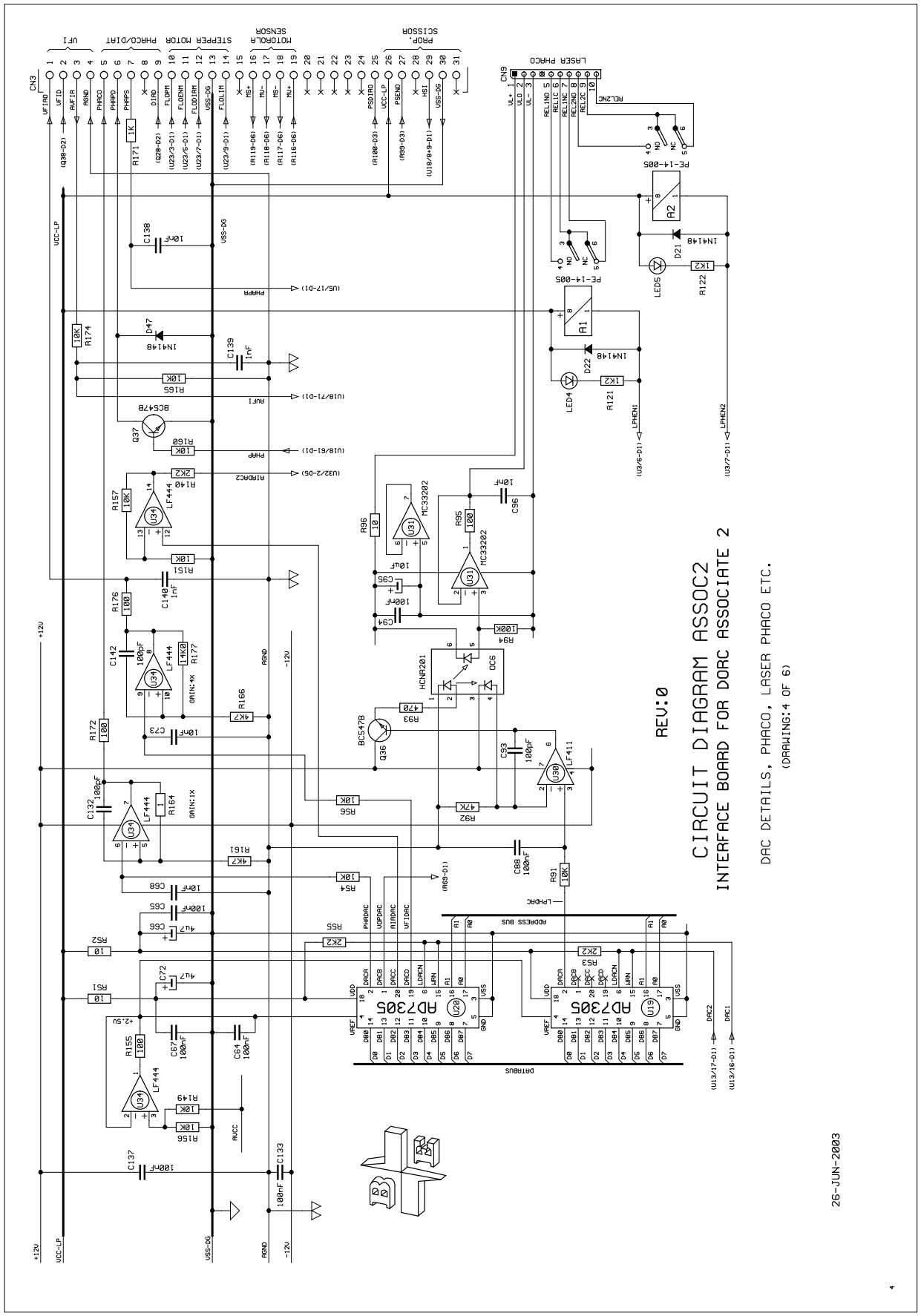
4.12 Embedded board

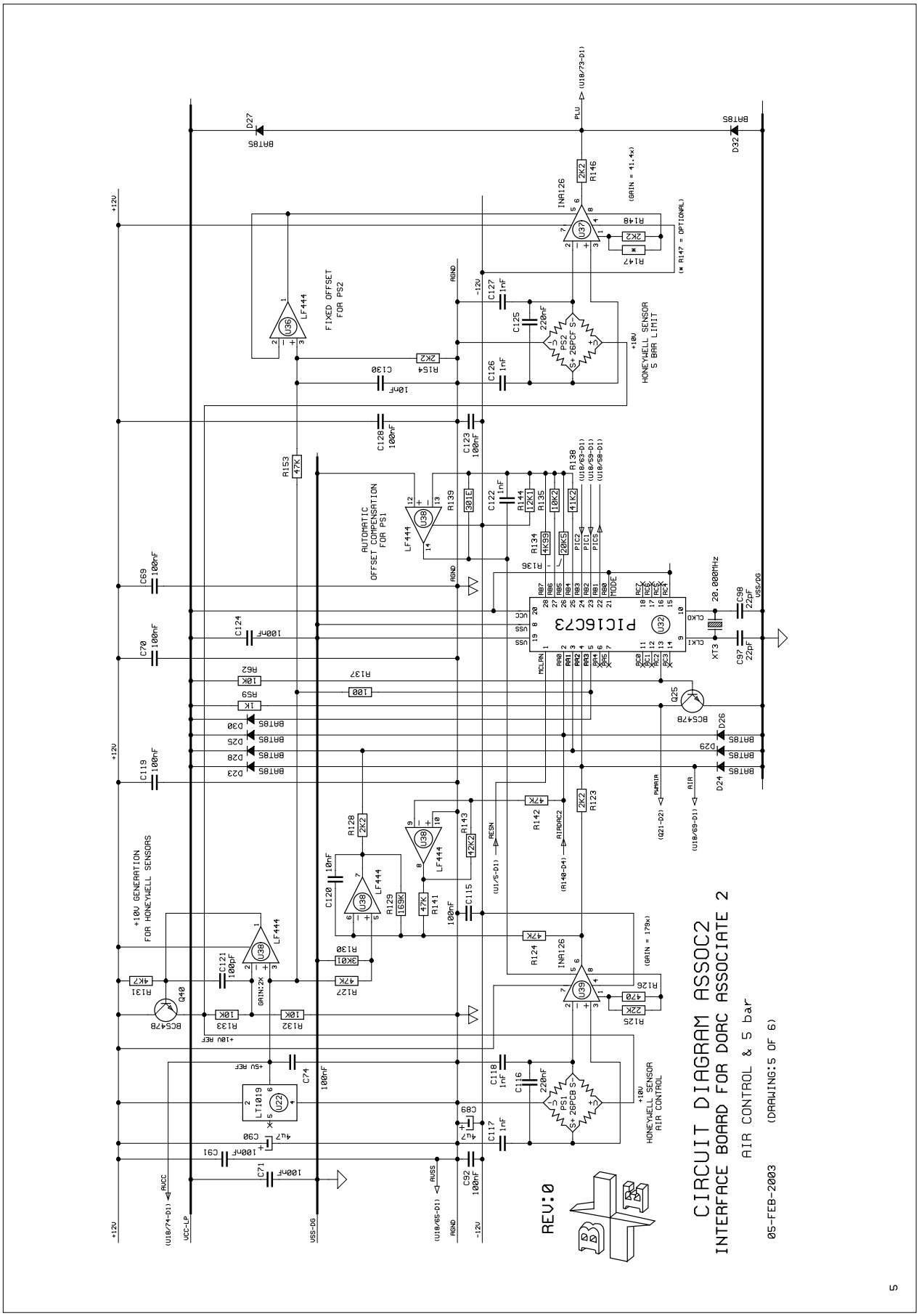


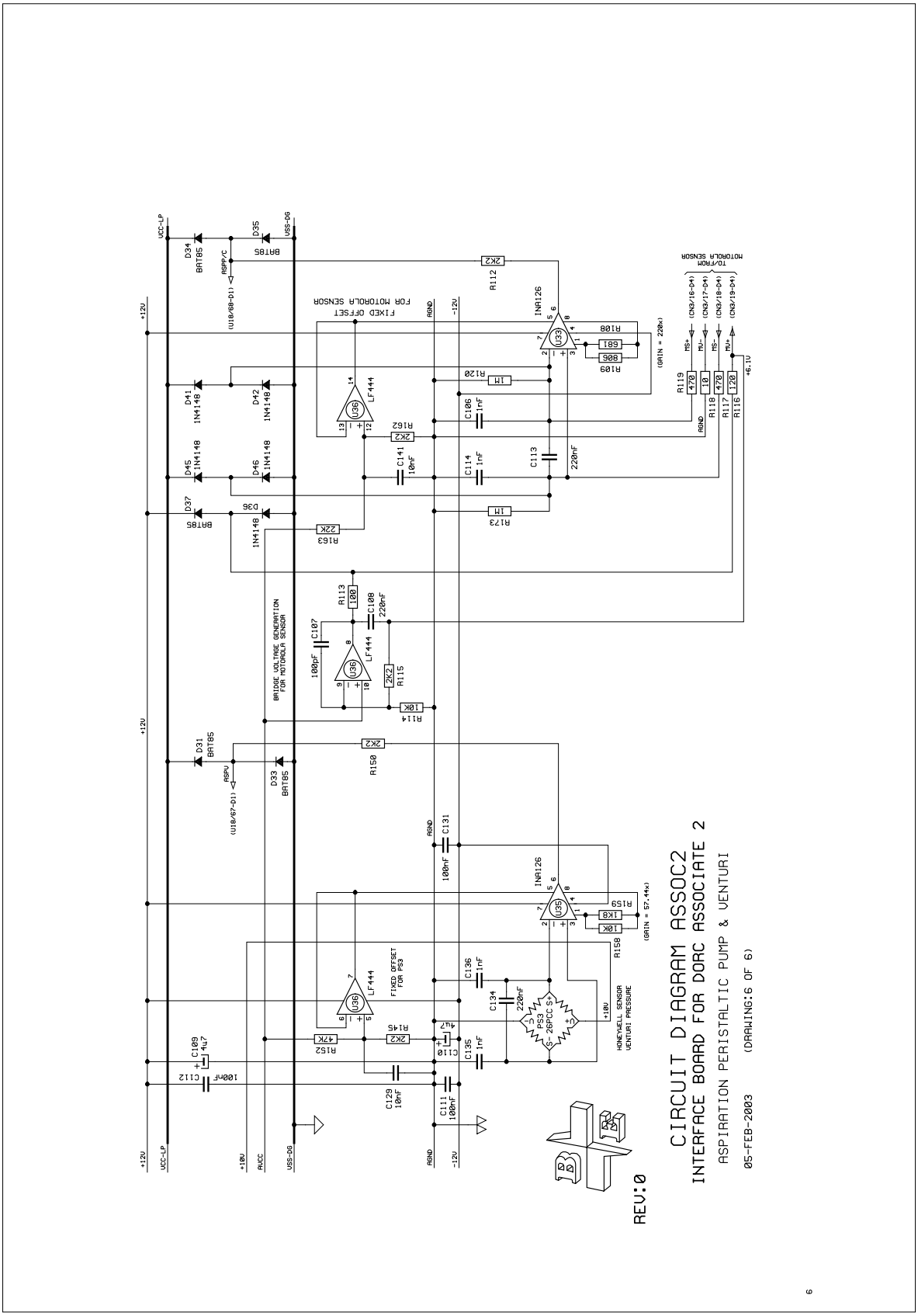

CIRCUIT DIAGRAM ASSOC2
INTERFACE BOARD FOR DORC ASSOCIATE 2
REV:0
CPU, MEMORY, SERIAL I/O, LAMP CONTROL, ADDRESS DECODER & SOME PARALLEL I/O
(DRAWING:1 OF 6)
8-AUG-2003
H8/534/536 SCP
RAM / EPROM
GAL20V8
HC42
TPIC6273
HC244
MAIN SERIAL PORT TO/FROM PC
FOOT PEDAL & 24V POWER
SCISSOR & ELVI
FOOT PEDAL MOTOR CONTROL
LAMP CONTROL
LIGHT CN5


CIRCUIT DIAGRAM ASSOC2
INTERFACE BOARD FOR DORC ASSOCIATE 2
REST OF PARALLEL I/O, INFUSION POLE
(DRAWING:2 OF 6)
REV:0
28-MAR-2003


CIRCUIT DIAGRAM ASSOC2
REV:0
INTERFACE BOARD FOR DORC ASSOCIATE 2
ELVI, SCISSOR, PROPORTIONAL SCISSOR & SOUND
(DRAWING:3 OF 6)
28-MAR 2003
AT89S8252
AD557
TO/FROM OPTO COUPLERS
ELVI & SCISSOR CONTROL
PROP. SCISSOR CONTROL
PROPORTIONAL SCISSOR CONTROL
RS-232 SOUND PORT
SOUND GENERATOR
SOUND MODE
AUDIO OUT

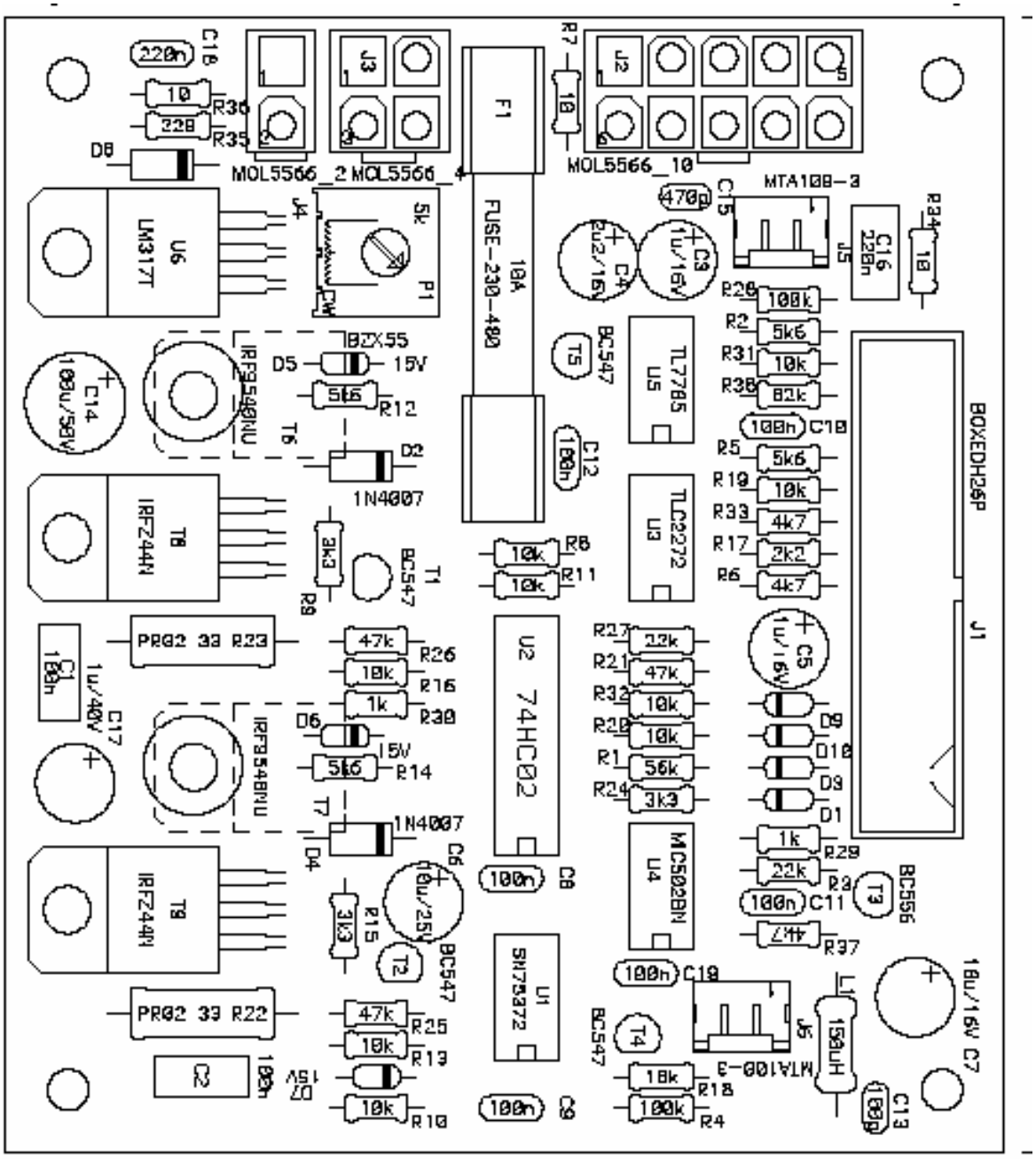

CIRCUIT DIAGRAM ASSOC2
INTERFACE BOARD FOR DORC ASSOCIATE 2
REV:0
DAC DETAILS, PHACO, LASER PHACO ETC.
(DRAWING:4 OF 6)
26-JUN-2003
CN3
CN9
LASER PHACO
SCISSOR PROP.
MOTOROLA SENSOR
STEPPER MOTOR
PHACO/DIAT
UFI
AD7305
ADDRESS BUS
DATABUS
LF444
MC33202
HCNR201
LF411
BC547B
BC547B
IN4148
PE-14-00S
+12V
-12V
VCC-LP
VSS-DG
AGND
AVCC


CIRCUIT DIAGRAM ASSOC2
INTERFACE BOARD FOR DORC ASSOCIATE 2
AIR CONTROL & 5 bar
05-FEB-2003 (DRAWING:5 OF 6)
REV:0
PIC16C73
LF444
INA126
LT1019
BAT85
BCS478
+10V GENERATION FOR HONEYWELL SENSORS
AUTOMATIC OFFSET COMPENSATION FOR PS1
FIXED OFFSET FOR PS2
HONEYWELL SENSOR 5 BAR LIMIT
HONEYWELL SENSOR AIR CONTROL
+12V
-12V
AGND
VSS-DG
VCC-LP
20.000MHz

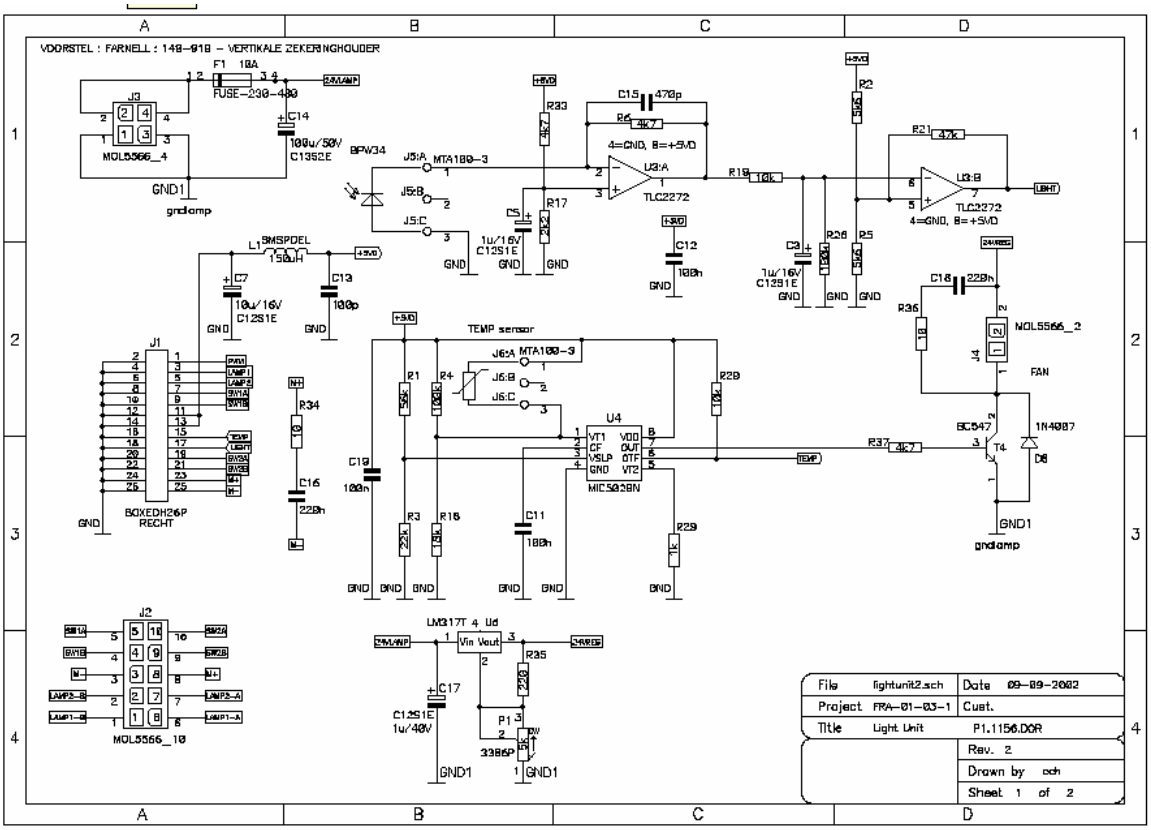

CIRCUIT DIAGRAM ASSOC2
INTERFACE BOARD FOR DORC ASSOCIATE 2
ASPIRATION PERISTALTIC PUMP & VENTURI
05-FEB-2003 (DRAWING:6 OF 6)
REV:0
BRIDGE VOLTAGE GENERATION FOR MOTOROLA SENSOR
FIXED OFFSET FOR MOTOROLA SENSOR
FIXED OFFSET FOR PS3
HONEYWELL SENSOR VENTURI PRESSURE
TO/FROM MOTOROLA SENSOR
+12V
-12V
+10V
AGND
AVCC
VCC-LP
VSS-DG
LF444
INA126
1N4148
BAT85

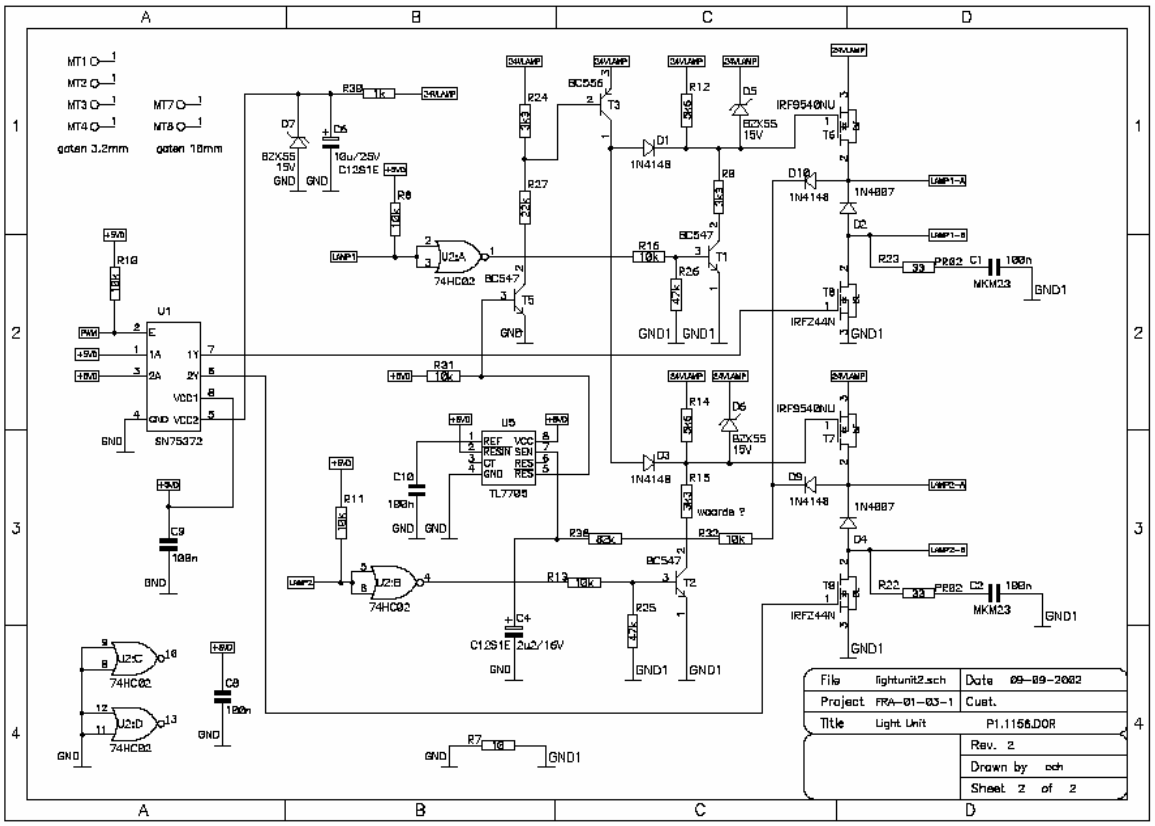
Connector number	**Description**	
CN1-3	To base plate connection	
CN4	Led front	
CN5	Light	
CN6	Only service (sound)	
CN7	Audio out	
CN8	RS232 to PC	
CN9	Auxiliary	
PS1	Air pressure	Honeywell 26PCB
PS2	Main pressure	Honeywell 26PCF
PS3	Vacuum pressure	Honeywell 26PCC
U12	RAM / EPROM	Software associate

4.13 Light

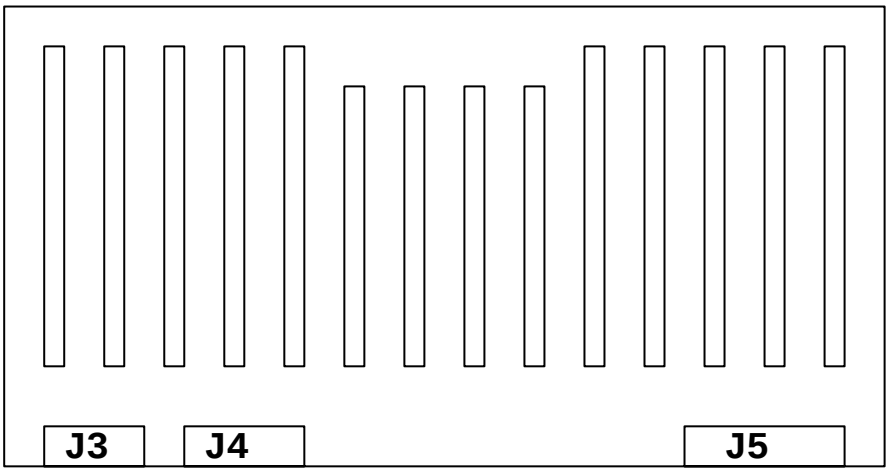


Connector number	Description
J1	Band cable to embedded
J2	Lamp, motor and switches
J3	Supply 32V
J4	Fan
J5	Light sensor
J6	Temp sensor
F1	Fuse 10AT


VOORSTEL : FARNELL : 148-918 - VERTIKALE ZEKERINGHOUDER
F1 10A
FUSE-230-400
MOL5566_4
C14
100u/50V
C13S2E
BPW34
J5:A MTA100-3
J5:B
J5:C
C15 470p
R6 4K7
U3:A
TLC2272
4=GND, 8=+5VD
R19 10K
R2 5K6
R21 47K
U3:B
TLC2272
4=GND, 8=+5VD
LIGHT
R17 2K2
C5 1u/16V
C12S1E
C12 100n
C3 1u/16V
C12S1E
R20 150R
R5 5K6
C18 220n
R35 10
MOL5566_2
J4
FAN
L1 SMSPDEL
150uH
C7 10u/16V
C12S1E
C13 100p
J1
BOXEDH26P
RECHT
TEMP sensor
J6:A MTA100-3
J6:B
J6:C
R1 50K
R4 100K
R29 10K
U4
MIC5020N
R37 4K7
BC547
T4
1N4007
D8
R34 10
C16 220n
C19 100n
R3 22K
R18 18K
C11 180n
R28 1K
GND1
gndlamp
J2
MOL5566_10
LM317T 4 Ud
C17
C12S1E
1u/40V
R35 220
P1 3386P
2K
GND1
GND1


MT1
MT2
MT3
MT4
MT7
MT8
gaten 3.2mm
gaten 18mm
R38 1k
D7 BZX55 15V
D6 10u/25V
C12S1E
R8 10K
U2:A 74HC02
BC547
T5
R24 3K3
BC556
T3
D1 1N4148
R12 3K6
D5 BZX55 15V
IRF9540NU
T6
R27 22K
R16 10K
R26 47K
BC547
T1
D10 1N4148
1N4007
D2
R23 33
PR02
C1 100n
MKM23
GND1
IRF244N
T8
R10 10K
U1
SN75372
R31 10K
R14 3K6
D6 BZX55 15V
IRF9540NU
T7
D3 1N4148
R15 3K3
waarde ?
D9 1N4148
1N4007
D4
R36 82K
R30 10K
BC547
T2
R13 10K
R25 47K
R22 33
PR02
C2 100n
MKM23
GND1
IRF244N
U5
TL7705
C10 100n
R11 10K
U2:B 74HC02
C4
C12S1E 2u2/16V
U2:C 74HC02
U2:D 74HC02
C8 100n
R7 1R
GND1
File lightunit2.sch
Date 09-09-2002
Project FRA-01-03-1
Cust.
Title Light Unit
P1.1156.DOR
Rev. 2
Drawn by ech
Sheet 2 of 2

4.14 Phaco and Diathermy



Connector number	Description
J3.1	Power Ground RTN
J3.2	Power supply 24V
J3.3	Power Ground RTN
J4.1	Input phaco on
J4.2	Input diat on
J4.3	Input power control lin.
J4.4	Signal ground RTN
J4.5	Output fault phaco
J5.1	Phaco handpiece
J5.2	Phaco handpiece
J5.3	Detect type of handpiece
J5.4	Detect type of handpiece
J5.5	Cauter
J5.6	Cauter

Section 5 - Update letter

5.1 calibration and test software

SERVICE LETTER

D.O.R.C. International b.v.

Scheijdelveweg 2
3214 VN Zuidland - HOLLAND
Phone: +31 181 458080
Fax: +31 181 458090
E-mail: tech.support@dorc.nl

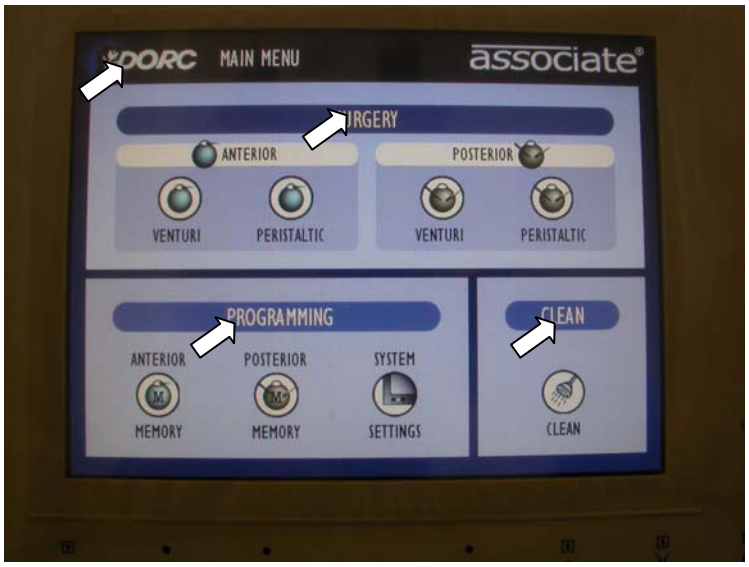
Product nr.	Description	Applicable serial nr.'s
6700	Associate Dual	For software version 1.34 and higher.

Title of Service Letter :

Test and Calibrate program of the Associate.

Procedure:

For testing the unit, there is a Test & Calibrate screen. This screen can be accessed by pressing DORC, SURGERY, PROGRAMMING, CLEAN, DORC in the main menu.
The test & calibration screen is available from software version 1.34/2.22.
The software version can be seen at the bottom of the System settings screen, which can be selected in the main menu.

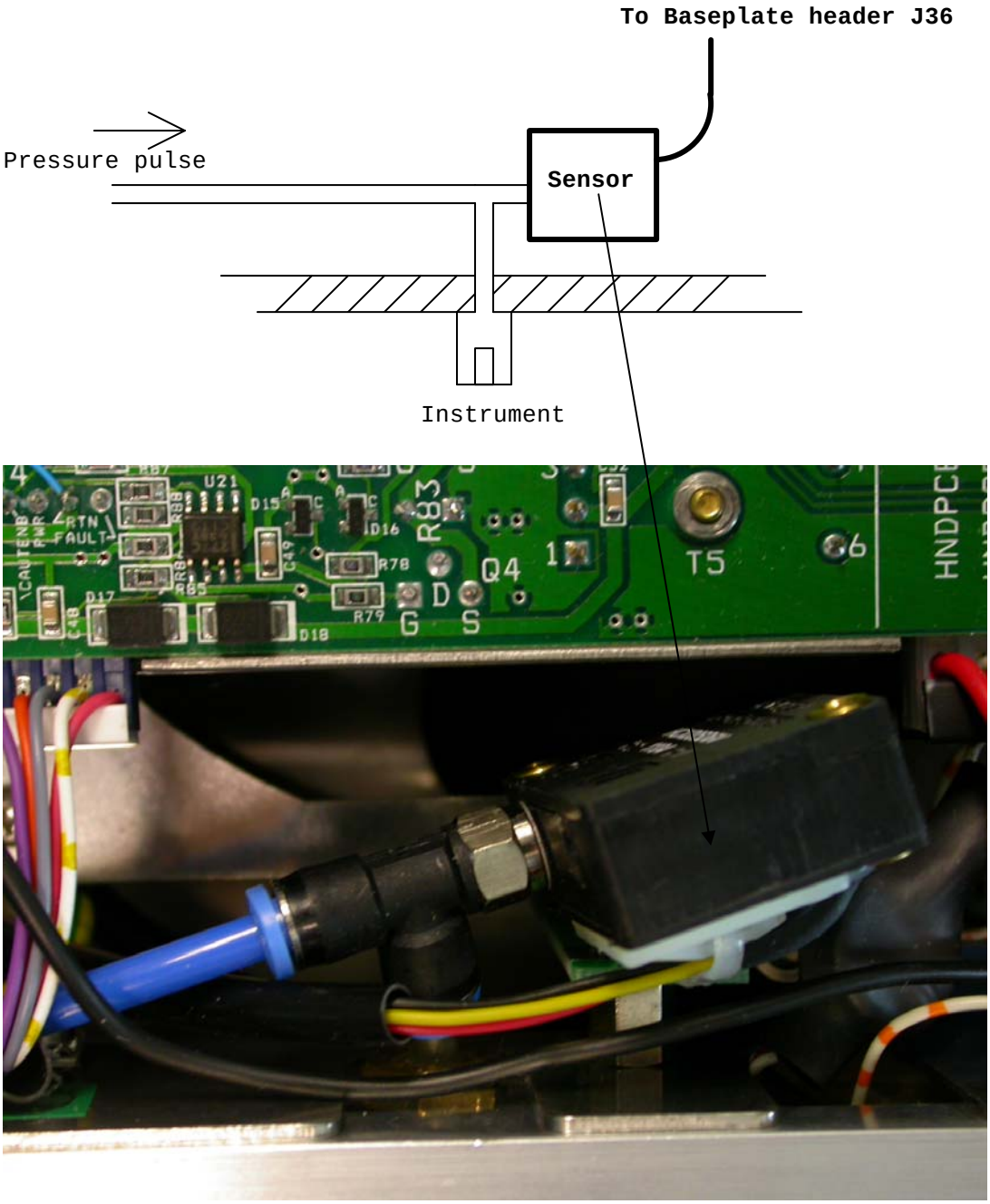


For any questions, please contact the after sales department.

End of this procedure.

5.2 Introducing 2500 cutting range from SN200451214 to SN20051243

Unit's from Sn 200451214 are prepared with 2500 cuts valve. Contact the after sales department for software update to use this functionality in the future.

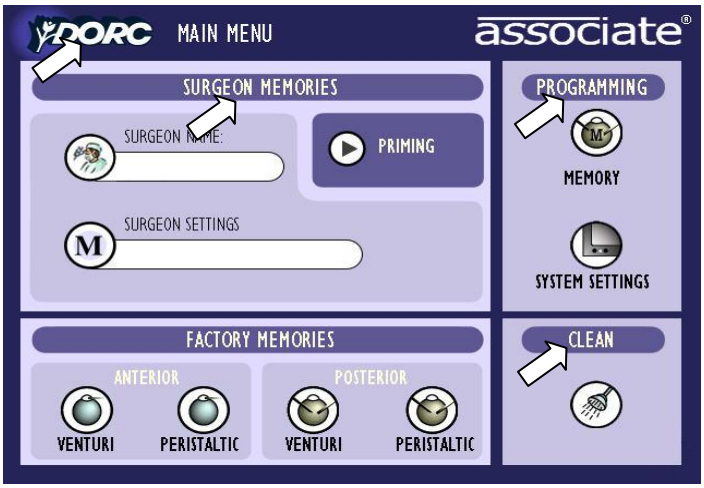


5.3 Introducing 2500 cutting range from SN 200451243

From SN200451243 we use a new valve and we do not longer need the modification as used in SN200451214To SN 200451242 See par 4.3.1

5.4 Introducing new GUI from SN 200651..

From SN200651… we use a new GUI.
For testing the unit, there is a Test & Calibrate screen. This screen can be accessed by pressing DORC, SURGERY, PROGRAMMING, CLEAN, DORC in the main menu.



5.5 Introducing Embedded XP from SN 200751421

From SN200751421 we use a new pc-board and new operation system.
The PC-board needs forced cooling. Connected on J3 PSU power supply 20614600.

Section 6 - Warranty

D.O.R.C. International b.v. warrants that all possible care was used in the choice of materials and manufacture of its products.

The D.O.R.C. International b.v. warranty will not be valid in case non-original D.O.R.C. accessories and/or spare parts are used !

D.O.R.C. International b.v. shall not be liable for any incidental or consequential loss, damage or expense, arising from abuse of its products. However, if D.O.R.C. International b.v.'s investigation shows that its products were defective at the time of shipment by D.O.R.C. International b.v., products will be replaced/repaired at no charge.

Otherwise all D.O.R.C. International b.v. equipment is covered with a full year warranty, which does not cover the accessories.

D.O.R.C. International b.v. neither assumes nor authorizes any other person to assume for it, any other or additional liability or responsibility in connection with its products.